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Number 2.

AUGUST, 1899.

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620 ATLANTIC AVENUE,
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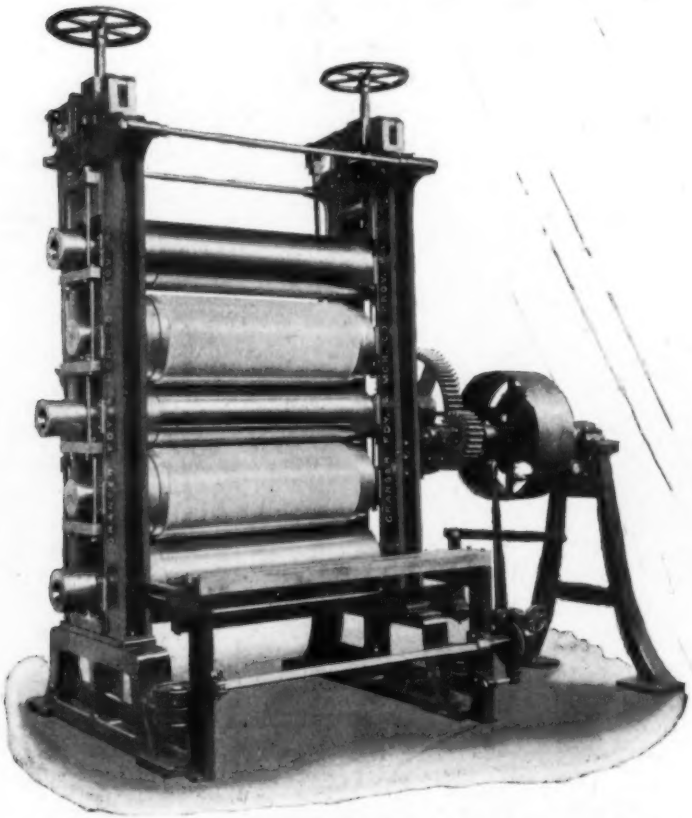
Bleaching, Dyeing, Drying,

And Finishing Machinery.



CALENDARS, MANGLES AND ROLLS.

TENTERING MACHINES,
MERCERIZING MACHINES.

Granger Foundry and Machine Co.

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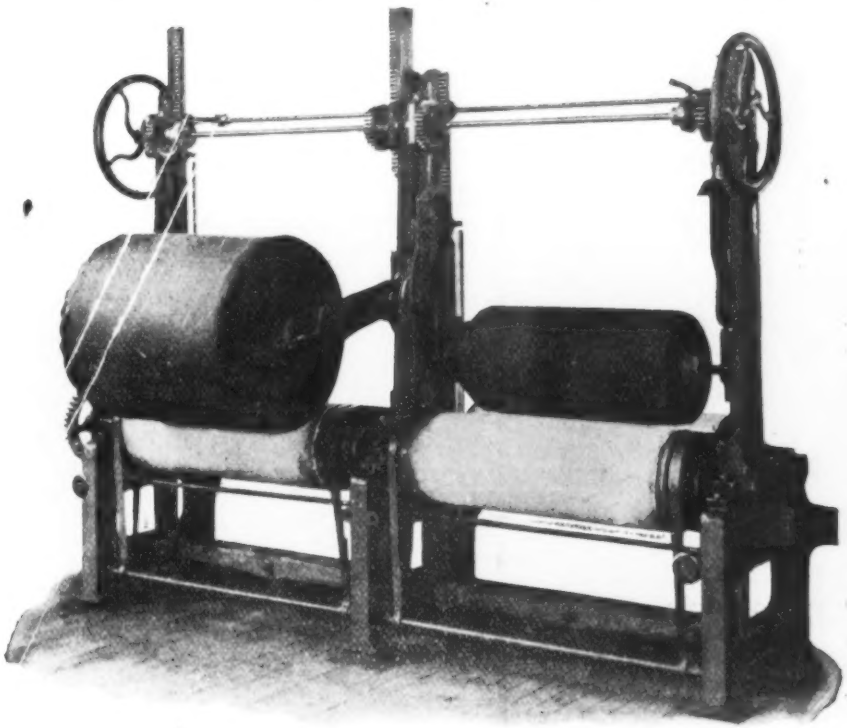
For Textile Fabrics



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No stoppage or even "Slacking up" of the machine is necessary.

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As creased ends are avoided at beginning and end of roll, no refinishing is ecessary.

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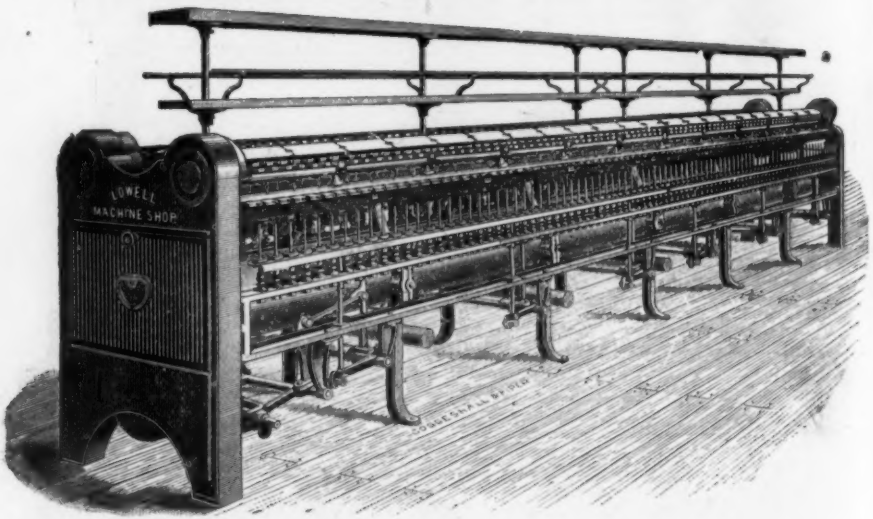

Revolving Flat Cards,
Railway Heads,
Drawing Frames,
Roving Frames,
Ring Spinning Frames,
Twisters, Spoolers,
Warpers, Slashers,
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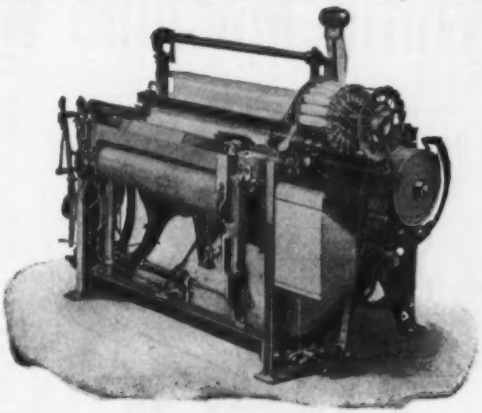

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MANY cotton mill managers will, therefore, conclude that they can possibly have a chance to run their old machinery at a profit instead of facing a daily loss.

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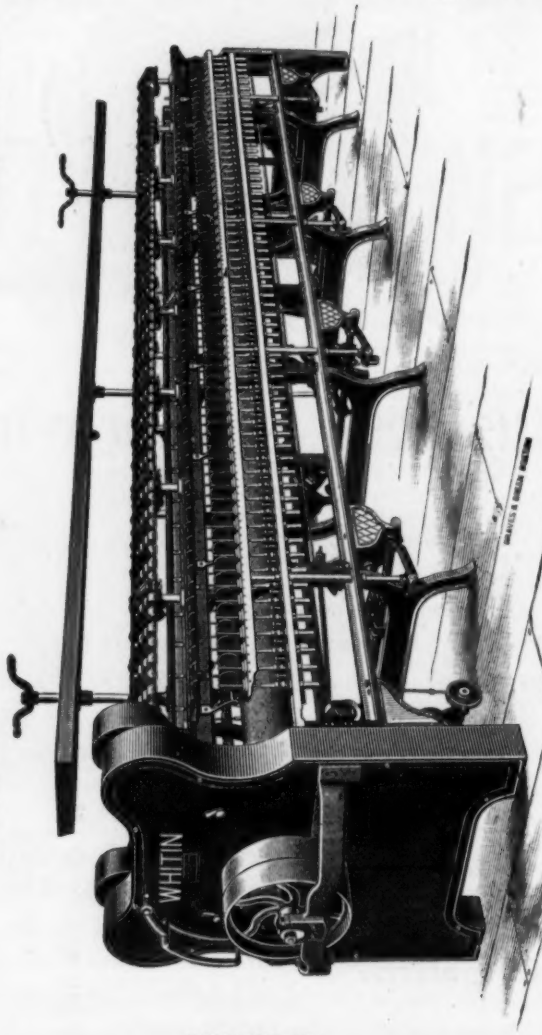

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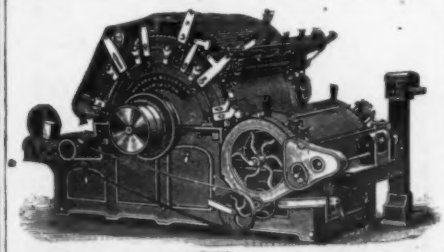

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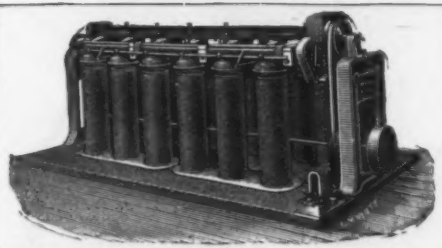

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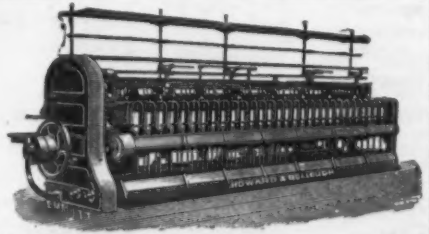

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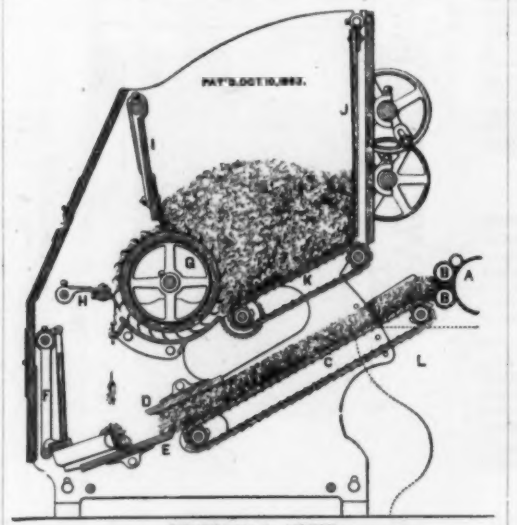
WOONSOCKET WORSTED MILLS,
EDWIN FARNELL, Agent.



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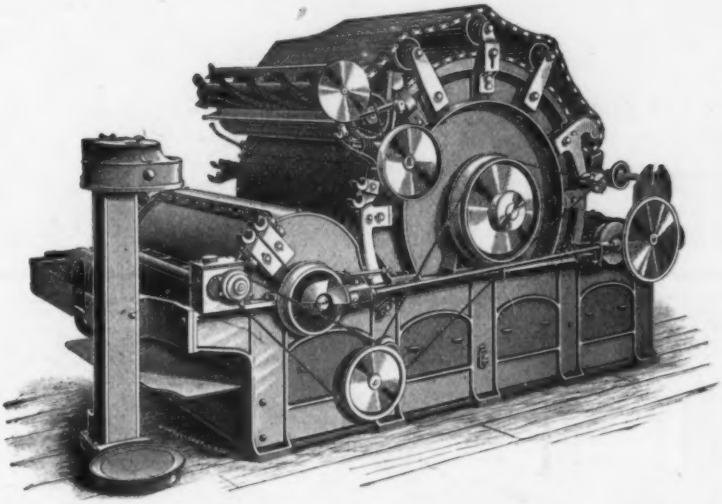

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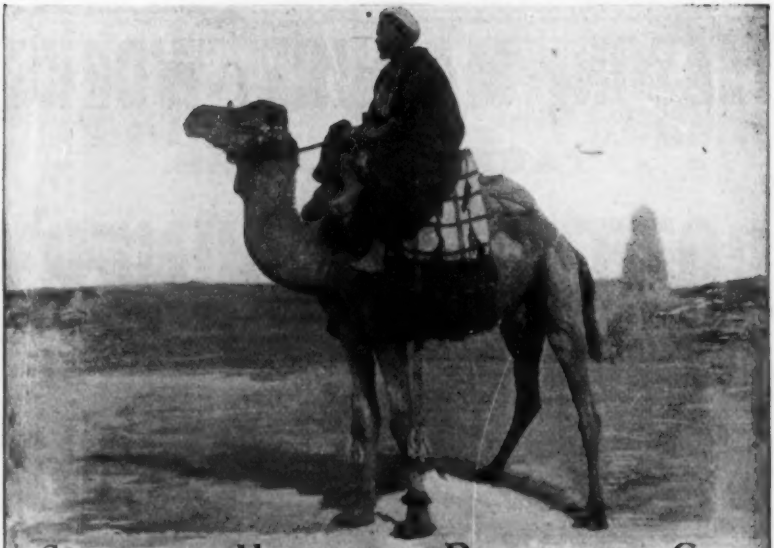

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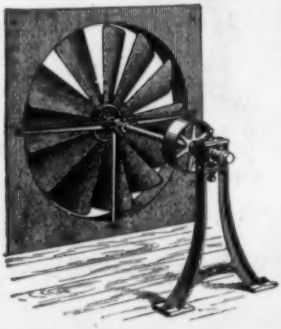

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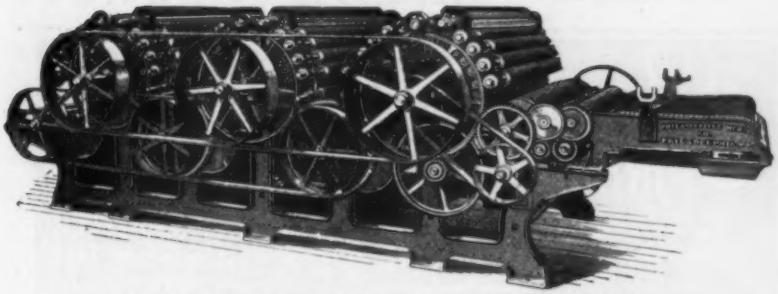

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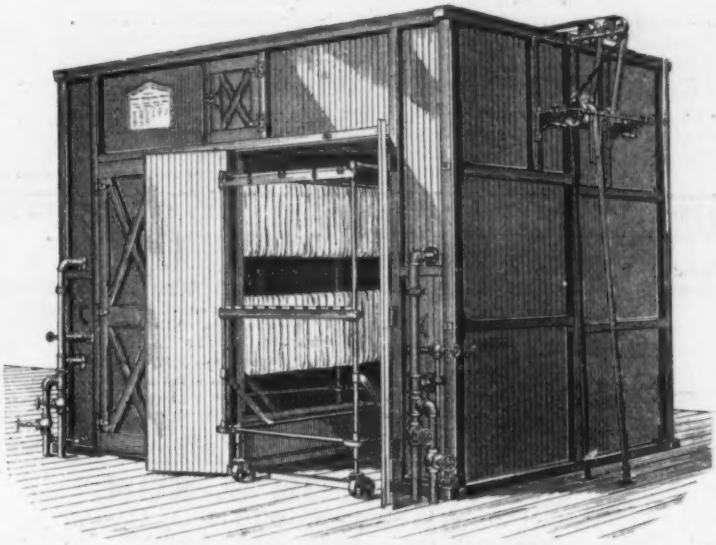

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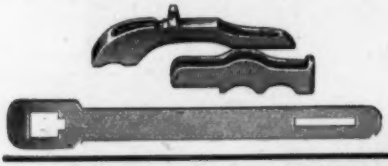

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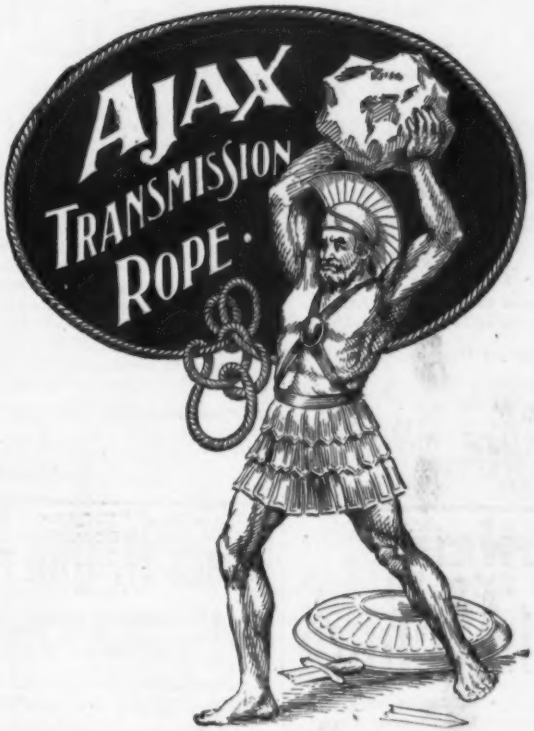

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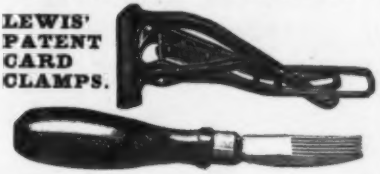

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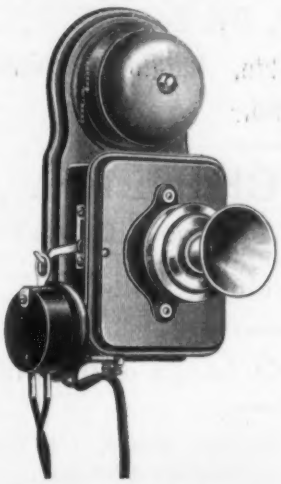

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BOSTON TEXTILE.

An Illustrated Monthly Magazine representing the Textile Industries of the United States.

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Dry Goods Commission Merchants,
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Buyers from First Hands.

Special quarterly issues are published in January, April, July and October; one (January) being a statistical issue, and the others devoted especially to the cotton, knitting and woolen branches, respectively.

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George W. Gregory, in November, 1874, resigned his position as Principal Examiner U Patent Office to enter the firm.

Patents secured in the United States and all other countries, Reissues obtained. Interferences conducted. Suits brought and defended for infringement, and searches made as to the validity of patents. Prepared to give special and expert attention to cases involving knowledge of cotton, wool, leather and metal working machinery, including boots and shoes and electrical, chemical and metallurgical inventions and steam engineering Correspondence solicited. No charge for preliminary advice. Personal consultation best when possible.

HOPEDALE, Mass., January 2d, 1896.

Mr. George W. Gregory, of Crosby and Gregory, has taken out for us since January, 1875, more than two hundred patents. GEO. DRAPER & SONS.

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List of Textile Patents.

Issued June 27, July 4, 11, 18 and 25, 1899.

Card, Jacquard or Dobby. 629,303. Henry Pelican, Philadelphia, Pa., assignor of one-half to John Eppler, same place.

Card-Clothing, Foundation for. 629,326. Elijah Ashworth, Manchester, Eng.

Card-Flats, End Clip for. 628,830. Chas. Mills and R. W. Hunton, Newton, Mass., assignors to the Saco & Pettee Machine Shops, same place.

Carding-Engine, Traveling Flat. 628,216. Robert Taylor, Jr., Oldham, England.

Carding-Engine, Traveling Flat. 629,052. Robert Taylor, Jr., Oldham, England.

Carding-Engines, Alarm Apparatus for. 628,493. Percy H. Russell, Sangerville, Me., assignor of one-half to Jas. L. Gordon, same place.

Cloth-Clamp for Textile Machinery. 629,741. Albert W. Rutterworth, Philadelphia, Pa., assignor to the H. W. Butterworth & Sons Company, of Pennsylvania.

Cloth-Pressing Machine. 628,242. David Gessner, Worcester, Mass.

Cotton Press. 629,345. Frank L. Dyer, Washington, D. C., assignor to the American Cotton Co., New York City.

Driving-Belt, Knitted. 628,818. Max Koch, Apolda, Germany, assignor to Ernst Miltsch and Walter Jacobi, same place.

Elastic Fabric, Woven. 628,934. Jos. W. Green, Jr., and George Astill, Easthampton, Mass.

Embroidering-Machines, Shuttle for. 629,278. Johan J. Sonderegger, Arbon, Switz., assignor to Stickerei Feldmuehle, vormals Loeb, Schoenfeld & Co., Rorschach, Switz.

Fabric, Woven and Mode of Weaving Same. 629,292. Harry Hardwick, Philadelphia, Pa., assignor to the Ivins, Dietz & Metzger Co., same place.

Fibre-Lapping Machines, Attachment for. 629,164. Wm. T. Hurley, Kimesville, N. C.

Hank-Dyeing Machine. 629,715. Jos. W. Crowther, Kirkheaton, Eng.

Hemstitch Embroidering Machine. 627,748. Julius Gutmann, Berlin, Germany, assignor to Fabrik fur Spezialnahmaschinen Actien-Gesellschaft. (Patentee Julius Gutmann), Zurich, Switzerland.

Knit Fabric. 627,945. John Waterfield, Providence, R. I.

Knitting Machine. 627,786. John Waterfield, London, Eng., assignor of two-thirds to William Badcock and Henry Baldwin Edwards, same place.

Knitting-Machine. 629,503. Joshua D. Hemphill, Shelton, Ct., assignor of one-half to Walter W. Radcliffe and Frederick W. Radcliffe, same place.

Knitting Machine, Circular. 629,116. Frank Wilcomb, Pawtucket, R. I.

Knitting Machines, Latch-Opener Attachment for. 629,155. Wm. J. Elliott and Irving M. Miller, Valatie, N. Y.

Loom. 629,311. Arthur W. Beardsell, Milford, Mass., assignor to the Draper Co., Portland, Me., and Hopedale, Mass.

Loom. 628,893. James H. Northrop, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Me.

Loom. 628,206. Wm. J. Lutton, Paterson, N. J.

Loom. 628,226. Earl P. Mason, Newport, R. I., assignor to the Draper Co., Hopedale, Mass. and Portland, Me.

Loom. 628,228. Jonas Northrop, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Me.

Loom, Circular. 628,093. Josef Herold, Brunn, and Carl Herold, Koingsfeld, Austria-Hungary, assignors to Rundwebstuhl Fabrik Herold & Richards, Brunn, Austria-Hungary.

Loom, Circular. 629,251. Josef Herold, Brunn and Carl Herold, Koingsfeld, Austria-Hungary, assignors to Rundwebstuhl Fabrik Herold & Richards, Brunn, Austria-Hungary.

Loom, Haircloth. 628,231. Charles E. Pervear, Wm. W. Harrison, and John Holt, Pawtucket, R. I.

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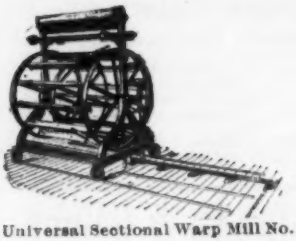

Universal Sectional Warp Mill No. 123.

Universal Sectional

Warp Mill No. 123.

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Loom-Shuttles, Filling-Carrier for. 628,772. John V. Cunniff and Edward Cunniff, New Bedford, Mass., assignors to the Draper Co., Hopedale, Mass., and Portland, Me.

Looms, Attachment for. 628,914. Joseph Begins, Lisbon Centre, Me.

Looms, Filling-Supplying Mechanism for. 627,803. Alvah W. Clement, Hopedale, Mass., assignor to the Draper Company, same place and Portland, Me.

Looms, Harness-Evening Mechanism for. 629,220. Wm. W. Uhlinger, New York City.

Looms, Motor Apparatus for. 629,504. Albert B. Herrick, Ridgewood, and Wm. M. Brock, Paterson, N. J.

Looms, Shedding Mechanism for. 628,154. Secondo Arienta, Paterson, N. J.

Looms, Warp Stop Motion for. 628,731. Alfred Wilkinson, Bradford, England.

Mercerizing Apparatus. 628,669. George W. Miller, Woonsocket, R. I.

Ribbon-Fraying Machine. 627,508. Leonidas E. King, Marshalltown, Iowa.

Ring-Spinning Frame. 627,698. George H. Leonard and Ross L. Reynolds, Fall River, Mass., assignors of one-third to George H. Bush, same place.

Roller Cotton-Press. 627,743. Charles L. Bessonette, Waco, Texas, assignor, by Mesne assignments, to the American Cotton Company, New York City.

Shuttles, Machine for Inserting Bobbins in. 629,308. Johan J. Sonderegger, Arbon, Switzerland, assignor to Stickerei Feldmuehle, Vormals Loeb, Schoenfeld & Co., Rorschach, Switzerland.

Spindle. 628,523. Malcolm Campbell, Boston, Mass.

Spindles, Bearing for. 11,761. John Kilburn, Belmont, Mass.

Spindles, Machine for Adjusting. 627,582. John Kilburn, Belmont, Mass.

Spinning Frames, Yarn-Protector Attachment for. 628,875. John C. Wall and Michael E. Schedlbauer, Jr., Amsterdam, N. Y.

Spinning Machine. 627,634. Edmund K. Baker, Springfield, Mass.

Spinning Machinery, Flier for. 629,071. John Good, New York City.

Spinning-Machines, Roving Stop Motion for. 629,495. Frederick S. Culver, Taunton, Mass.

Spinning-Ring Holder. 628,825. Earl F. Mason, Newport, R. I., assignor to the Draper Co., Hopedale, Mass. and Portland, Me.

Textile Fabric. 628,867. William Strang, Jr., Glasgow, Scotland.

Top Roll. 628,521. Leon W. Campbell, Woonsocket, R. I., assignor of one-half to Malcolm Campbell, Boston, Mass.

Top Roll. 628,522. Leon W. Campbell, Woonsocket, R. I., assignor of one-half to Malcolm Campbell, Boston, Mass.

Trimmings, Machine for Making. 629,451. Harry T. Loomis, New York City, assignor to Morris Frank and Julius J. Lambert, same place.

Warping Machine. 628,136. John H. Bentley, Paterson, N. J.

Warp Stop Motion. 627,963. Wm. P. Arthur, Lawrence, Mass., assignor to the Crompton & Knowles Loom Works, Worcester, Mass.

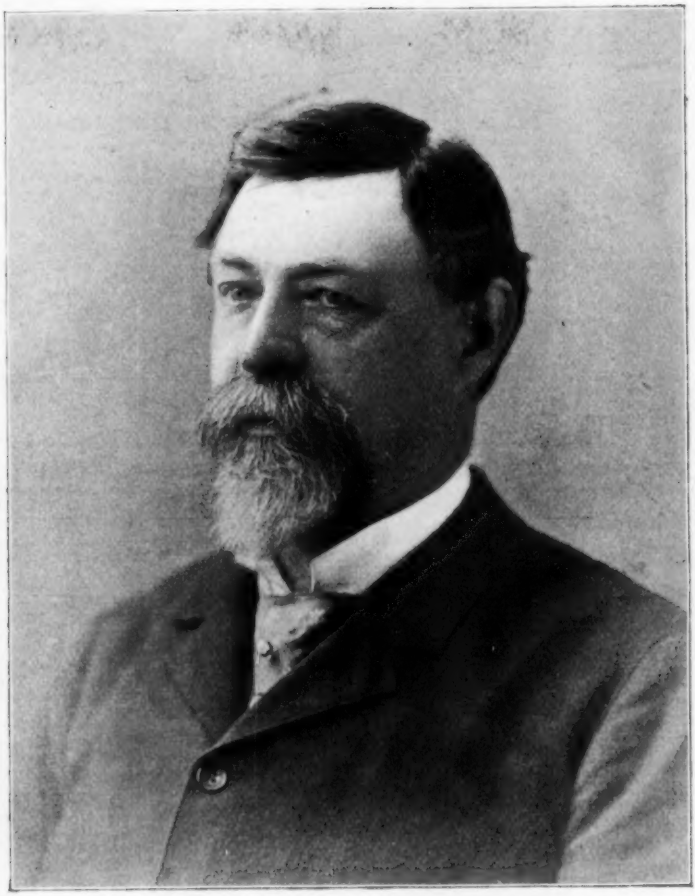
Warp-Threads, Machine for Drawing in. 628,627. Richmond H. Ingersoll, Biddeford, Me., assignor to Marcia M. Ingersoll, same place.

Warp-Threads, Machine for Drawing in. 628,628. Richmond H. Ingersoll, Biddeford, Me., assignor to Marcia M. Ingersoll, same place.

Yarn, Apparatus for Drying. 629,138. Richard A. Gage, Pawtucket, R. I.

Yarn, Machine for Drying. 629,270. Josiah K. Proctor, Philadelphia, Pa., assignor to the Philadelphia Textile Machinery Company, same place.

Yarn, Process of Drying. 629,318. Richard A. Gage, Pawtucket, R. I.



ALBERT R. SHERMAN.

TEXTILE WORLD.

Vol. XVII. AUGUST, 1899. No. 2.

ALBERT R. SHERMAN.

The recent death of Albert R. Sherman, Pawtucket, R. I., is another instance of the passing away of those who have been closely connected with the textile industry of this country. Mr. Sherman had been in failing health for a number of months previous to his demise.

Mr. Sherman was the second child of Simon P. and Hannah G. Sherman, and was born in Providence, January 23, 1838. His early teaching was received in the public schools of Providence, and he afterward attended the academy of Jenks Mowry at North Providence, and later took a course in mechanical drawing at Schofield's Commercial College in Providence. At the close of his school days he was employed by the A. & W. Sprague Manufacturing Company of Providence as master mechanic. This position he held for fifteen years, and in 1876 he was engaged by the Fales & Jenks Machine Company of Pawtucket as selling agent. Later he became agent for the United States Cotton Company and the Hope Thread Mill. He remained in these positions for twelve years, when he retired from active business life and went abroad, visiting the large manufacturing establishments in Europe.

On his return he devoted his time to making improvements in spinning and twisting machinery. His achievements in mechanism have a world-wide reputation. Among them was the invention of the Sherman spinning and twisting spindle. He also perfected improvements upon the Rabbeth spinning spindle. These spindles are now extensively used, both at home and abroad, and their invention and improvement accomplished much for the spinning industry, as their capability of being operated at a much higher rate of speed than the old style spindles ensured a much larger production of yarn at a less cost.

In politics Mr. Sherman was a Democrat. He served as State Senator from Pawtucket in 1889, 1890 and 1891.

In August, 1860, Mr. Sherman was married to Alma W. Tibbetts of Warwick, R. I., where the couple resided prior to coming to Pawtucket. His wife died November 17, 1888. By this union there were two children, Charles E. and Albert Everett. The latter is now living. Mr. Sherman's parents were born at North Kingstown, R. I., his father being a descendant of Philip Sherman, one of the early settlers of Rhode Island.

Mr. Sherman was an agreeable companion, and an interesting conversationalist, especially on scientific subjects. He possessed a kind heart and was very charitably inclined.

For a number of years he was a member of the Pawtucket Business Men's Association. He was not known as a secret society man, but he was a charter member of Narragansett Lodge, No. 8, Knights of Pythias, which was instituted at Riverpoint June, 1871, and he was also a member of the Grand Lodge of that Order, entering it in the year 1872. He was also a member of the Improved Order of Red Men, but withdrew from both orders a number of years ago.

—The Kip-Armstrong Co., which controls the patents of William H. Baker for an electric warp stop motion, has leased the rights under these patents to the Crompton & Knowles Looms Works, and Fred M. Armstrong, of Providence, who has for the past year represented the Kip-Armstrong Co. in New England, has gone with the Crompton & Knowles Works to take full charge of that department. The stop motion has been introduced in a number of the large mills and others are giving it a trial. We understand that it is a meritorious device.

—Some of the distinguished textile productions of Persia are: Krman shawls, made of goat-hair, which are in no way inferior to the celebrated Kashmere shawls. Kashan is knowu from its so-called shot velvets. Resht is distinguished by shot silk furnishing stuffs, table covers, and saddlecloths, embroidered in silk; Kashan and Yezd by velvets and brocades embroidered in gold or silver; Kashan, Yezd, Resht, and Tabris, by silk, scarves, and pocket handkerchiefs.

—There is certainly no school which can compare with the higher commercial school in Japan in comprehensiveness and minuteness of programme, but though the programme is splendid, it strikes one as being too theoretical.

—The commercial institute at Kobe, Japan was founded in 1878 by the Hiogo Prefectural Authorities, being subsequently subventioned and controlled by the Department of Agriculture and Commerce. Afterwards it was transferred to the Department of Education, which granted it a subsidy.

—Count H. de Chardonnet, who had endeavored for some time to produce a fibre resembling silk from nitro-cellulose, embodied the result of his earlier researches in a sealed note deposited with the French Academie des Sciences in May, 1884.

Directory Notice.

It has come to our attention that in several instances copies of the Directory, which have been sent out postpaid in full (10c.) from this office to subscribers, have been held for delivery until a further postage was paid. We should be glad to know of such instances. The Directory was mailed in a patent envelope, approved by the post-office authorities; and, although the flap was sealed, the end was open for inspection, and ten cents postage fully prepays same as printed matter, so that any further payment is unnecessary and a demand for such is a mistake on the part of the postmaster.

—A very handsome collection of American wools is to be made at the coming Paris Exposition. Representative specimens taken from the shoulder, back and belly of the fleece are to be selected from individual flocks representative of the different breeds of sheep raised in this country. Particular consideration will be given not only to blood, but to the climate and the geographical districts where the sheep are raised. It is also expected that a collective exhibit of wools will be made with special reference to their use in our manufactures. The merchants' and the manufacturers' requirements will be shown in typical specimens for ready comprehension.

One of the chief reasons for the success of American manufacturers, and which, if anything, enables them to compete in foreign markets, notwithstanding the relatively high priced labor that they are obliged to employ, is the vigorous and persistent attention that they give to the elements of business administration, aided, it may be said, by the command of extensive and economical means of transportation.

—The judgment of the ordinary purchaser is not so sensitive that he weighs for a moment the relative artistic merits of the fabrics he selects.

PRISON MADE CLOTH.

The State Board of Classification of New York is a commission authorized by the laws of 1896, of that Commonwealth, to regulate the production and disposition of the manufactures of the penal institutions of that state.

This commission recently held a meeting for the purpose of ascertaining the needs of the public institutions of New York for the clothing of their inmates. It appears that an immense amount of cassimere cloth is used by these several institutions.

It may not be known to our Massachusetts readers that there is a textile mill established at the State Reformatory, Concord. Everything is done there by machinery, except the weaving, which is confined to machines operated by hand. Some looms are being put into the state prison at Charlestown. The cloth produced at both places is in use only in the institutions of the state and counties.

The manufactures that are conducted at our penal institutions are encouraged for the purpose of giving employment to the prisoners, to occupy their time and minds, and to teach them an occupation which they can possibly put to use after regaining their liberty.

The purpose of the state, however, is to conduct these industries so as not to have a baneful effect upon the industries of the state in which law-abiding people are employed.

Some forms of labor are prohibited by the state to be done in the penal institutions. By an act of 1897, which became operative in 1898, all piece-price work, except cane-seating chairs and making umbrellas, is forbidden in the prisons.

According to the latest public report concerning the reformatory at Concord, there are, in that institution, 946 inmates, 44 per cent. of whom are engaged in productive industries, chiefly in the production of shoes, woolen and cotton cloth, and 20 per cent. are not engaged in any work, most of whom are in the schools for instruction.

In regard to the textile industries at the Concord institution we learn, as a result of a recent visit there, that they constitute the largest class occupation established under the statutes of 1898. We observed that the best machinery is used and the most improved methods are pursued in the manufacture of either wool or cotton into fabrics, with the exception that all the weaving is done on the hand loom. The wool, for instance, is taken and cleansed in the old fashioned rinse box, then colored and otherwise manipulated under the direction of an expert in the manufacture of woolen fabrics. The same is done in relation to cotton cloth. The woolen cloth is put to good uses, some of it being all wool, but a considerable portion of it is cotton warp and shoddy filling. The shoddy is made upon the premises from the rags obtained from the tailoring department. This latter makes all the goods into clothing as a finished product.

It is the intention of the state to have the industries self-supporting, and therefore the management has in view the avoidance of a financial loss.

It is proposed to manufacture hosiery at these institutions as soon as it can be brought about, the work to be done by hand power.

In New York state, the textile products are quite varied, the machinery all paid for from prison earnings, and the industry made self-sustaining. It has been stated or suggested that the work of prison convicts is so much taken away from free labor. While this may be true, to a certain extent, it is also true that were these men not in prison, they would be at work competing on the outside.

It can be readily seen that only the coarsest goods of simple fabrication can be produced at these prisons, as the help is, in all instances, unskilled, and but little can be expected from them for this reason, to say nothing of the lack of interest that they must have in doing good work.

DYE AND COLOR.

The words "dye" and "color" are oftentimes indiscriminately used without any apparent good reason.

By a recent decision of the board of general appraisers, an attempt has been made to arrive at some definition for these words as applied to importations of merchandise for dye house use. According to this decision, in a strict or definite sense, "color" relates more particularly to pigments which are, as a rule, insoluble in water, and are thus distinguished from those which are soluble in water, and which are "employed in imparting color to cotton, wool and other textile fibres and fabrics."

The framers of the tariff law were seemingly in doubt in their own minds regarding the particular meaning of these two words, in either their scientific or popular application. The tariff act of 1894 provided for the exemption from duty of "alizarin and alizarin colors or dyes," whereas the term "colors" is omitted in the corresponding paragraph of the present tariff act, the articles therein exempted being limited to alizarin and to "dyes" derived from alizarin or anthracin.

The corresponding dutiable paragraphs of the two acts, include, however, "coal tar colors or dyes," or "coal tar dyes or colors."

PATENT LITIGATION.

We devote considerable space in this issue to the decision of the Supreme Court relating to certain cotton compress devices affecting the economical operation of the machinery used for making cylindrical lap bales as turned out by the American Cotton Company.

The important points covered by the case in court, we have illustrated on page 35. We believe that we are the only ones that have published such an illustration in connection with this case.

The success of any business dependent upon the validity of a patent is always uncertain and to a great degree unsafe for the investment of capital. There is no doubt that much encouragement to our industrial system and its profitableness is derived from and is due to our patent laws which induce people to invent devices for the more efficient and economical employment of labor, and for the accomplishment of desirable ends by mechanical means. The result of this is that no other country has as many labor saving tools and machinery as our own; and it is by the aid of such means that the laboring classes are able to obtain higher wages, secure better food and clothes, and better houses and comforts, than are enjoyed by any other working people in the world. Notwithstanding the fact that inventors have done immense good for the happiness and comfort of men, they have oftentimes been treated most unjustly and cruelly. A long line of instances in this respect can be given for the last century or more in the textile industry alone.

One of the results of our labor saving inventions has been to reduce the hours of labor from fourteen or sixteen hours a day to what they are at the present time, with the early probability of their soon reaching eight hours a day. Under our laws, notwithstanding their excellent designs, it is exceedingly difficult to ascertain whether an invention is new or not, or whether it is patentable, as in the case to which we specially allude above. The question of conception enters into the validity of a patent and to this extent makes it dubious and extremely uncertain as a valuable asset in the investment of capital.

We do not care, nor are we capable, to pass judgment upon the equity of such a law, and we, therefore, must assume that it is based upon some idea of right and justice; yet it is not exactly clear in our minds why the first application for a patent should not operate more than a prima facie evidence of priority. It is doubtful as the law is often interpreted,

whether Amos Whittemore is entitled to the consideration of being the first inventor of the card clothing setting machine, instead of Eleazur Smith.

It is unnecessary for us to review in this place, the case which has just been decided by the Supreme Court of the United States, as the decision of this tribunal covers nearly all the essential points upon which to form any independent judgment that may be desired. We think, however, that if one will carefully examine the diagram which accompanies the decision of the court, as it appears in this issue, he will arrive at the opinion that the device is not, after all, a clearly patentable one, but if it is, it is one that can be gotten around without much difficulty by a good mechanic with original ideas. This view of the case, however, makes the success of the attorneys for the plaintiff so much more to their credit, as clever and erudite patent lawyers. The case in behalf of the plaintiff was exceedingly well handled in impressing upon the court facts and versions of the law affecting the validity of the patent, in such a manner as to obtain a decision in harmony therewith.

A petition for a re-hearing of the case has been entered, but not yet passed upon by the court.

COTTON WASTE.

For the twelve months ending June 30, 1899, there were imported 6,032,434 pounds of cotton waste, or a little less than 1/10th of the total imports of unmanufactured cotton.

For the fiscal year of 1898-99, the statistics of imports relating to cotton waste were for the first time reported. If cotton waste was imported prior to July 1, 1898, there is no specific record of it.

The larger portion of the importation for the last year was entered during the last six months, the imports for the first six months being nearly 2,279,350 pounds. The average price per pound was about 3½ cents, which shows a good quality of waste: this, of course, being the foreign value.

Samples of this merchandise have been sent to us for examination, at our request, and we find that it consists of various colored cotton thread wastes, both hard and soft, and used chiefly, as far as we can learn, for wiping machinery and like purposes. A certain amount of this waste consists of flocks, a sample of which has been sent to us from the New York appraisers' department, the quality of which is most excellent, but to what use it is put, we have not been able to ascertain satisfactorily. The staple is from ⅛ to ¼ of an inch in length. The sample sent to us is of cotton that had been bleached.

This waste appears to have been imported mainly at Cincinnati, then at New York, Philadelphia and Boston in the order of their mention. The larger portion for the first six months of the year came from Italy, followed by the Dominion of Canada, Great Britain, France and Germany in the order of their naming.

We refer to this class of importation as being apparently an innovation of a more or less disturbing nature to the cotton waste market, and which dealers have observed without fully realizing the cause, until their attention was called to it by us.

OUR FOREIGN COMMERCE.

According to the statistics of the Treasury Department, Washington, just issued, the total imports of merchandise into the United States for the fiscal year ending June 30, 1899, amounted to $697,116,854, 43 per cent. of which came in duty free; and the value of our exports amounted to $1,204,123,134.

The net imports of wool for the last fiscal year were comparatively small, amounting to only 64,324,293 pounds, over 95 per cent. of which consisted of carpet and third class wool.

Practically there was no import of first and second class wools. From about 13,000,000 pounds of first class

wool, which was imported, about 11,600,000 pounds were re-exported—taken from the ware-house.

The importation of wool manufactures for the last fiscal year amounted to nearly $13,831,967, which was about the same as that for the previous year, but more than $35,000,000 less than for the year of 1896-97.

The imports of wool manufactures for 1898-99 were so small that they have had no influence on the domestic market.

TEXTILES AT THE PARIS EXPOSITION.

A highly creditable exhibit of the textile manufactures of the United States at the forthcoming international exposition at Paris is now positively assured, representative of the very finest productions that are turned out by our mills. The American people in general, and even manufacturers themselves, are not fully aware of the excellent and serviceable goods that are produced by our textile factories.

The organization of many of our mills, both cotton and woolen, is of such a character that as fine and meritorious fabrics can be turned out as any that are made in the world. That this organization is not always utilized for turning out the finest class of goods is due chiefly, if not wholly, to the greater profitableness of making fabrics for the masses than for the few. That our mills can compete successfully with those of foreign countries in the fabrication of the finest manufactures was clearly and most emphatically demonstrated at the Chicago Exhibition of 1893. American manufactures that were seen there were commented upon by foreign judges in a way that their superiority was thoroughly appreciated, and a keener realization of this will be apparent in our American goods as will be shown at Paris next year; and we believe that gold medals are in waiting for all the exhibits, with possibly one or two exceptions, as awards for intrinsic merit and style.

Woolen manufacturers who have consented to make exhibits at the Paris exhibition, do so almost wholly for patriotic reasons, and as a duty that they owe to the United States government for the protection that they receive through our customs laws, against foreign competition, and in reserving for them the domestic market.

With but few exceptions, our mills making the highest grade of goods, both wool and cotton, have responded nobly and cheerfully to this call of the government, as expressed through the Paris commission, to make a meritorious exhibit of their best manufactures at Paris. They will go there with the best that skill and administrative ability can produce, and as representatives of an industry whose annual production is greater than that of any other single class of manufactures, valued at three-fourths of a billion dollars.

Taking all the exhibits of textiles and textile machinery, there will be about forty concerns to respond. This will surpass anything that has been heretofore attempted at any foreign International Exhibition. It will be the first time that a systematic exhibit has been made, representative of the industry of the United States at any foreign exhibition. What exhibits have heretofore been made under these conditions have been hastily collected without much regard to merit and without the least idea of system. They have been conglomerations of what could be gathered at the last moment by some one without much responsibility as to results.

Woolen manufacturers go there with their exhibits without much idea of ever being able to sell a yard of their products, and therefore they respond to any call made upon them, purely through patriotic motives. There are inducements, on the other hand, for cotton manufacturers, even those who are making the best and

finest line of goods, to show their productions abroad, as there is developing an export trade for such goods among a large class of people in Europe who are disposed to look with favor, and in some instances with admiration, upon American goods, without taking price into more than a secondary consideration.

TEXTILE COMBINES.

The combination schemes among mills in the textile line continue to be subject to discussion and fruition. We have already expressed our views in the abstract in former issues, concerning these combinations and their possible effect upon existing industries and upon business in general.

In some lines it is of material advantage to the public to have allied businesses under one management and subject to the same corporate control. A number of examples can be given where this is true, but none is more conspicuous or patent than the facilities and economies that are offered to the public by having the telegraphs and the telephones under one control. These huge corporate organizations, however, should have recognized responsibilities defined by legislative acts.

The combination of cotton yarn mills in Massachusetts has been effected upon an apparently equitable basis that gives promise of success. By bringing this combination under Massachusetts laws, wholly, will have the effect of creating in the public mind a more favorable impression of its financial accountability, and give it a better standing than it otherwise would possess if organized under such laws as those of New Jersey and Delaware.

There is some talk of mills being started for spinning yarn in competition with the New England Yarn Company. Many rumors are afloat concerning movements in this direction, but we are inclined to think that the objects of the promoters are more or less colored and distorted.

There seems to be renewed life in the scheme for the consolidation of the worsted spinning mills under the name of the United States Worsted Company. Some preliminary movements, in order to accomplish the desired end, are now being undertaken to the effect of obtaining a charter from the State of Pennsylvania for the purpose of securing clearer titles to the properties of the several mills in that State.

The old scheme of consolidating the bobbin and shuttle factories of the country is being tried over again, notwithstanding the bad failure that was made of it a few years ago. The capital of this new organization is fixed at $2,000,000, divided in the usual way, part cumulative preferred, and part common, stock. Properly managed we do not see why better results cannot be obtained than was the fortune of previous attempts.

The combination of the silk ribbon mills is no nearer realization, apparently, than several months ago. The ribbon manufacturers are by no means united as to its feasibility, unless the present plan of formation is somewhat modified.

REFORMS IN COTTON BALING.

The whole south is stirred up over the persistent efforts of different companies with large capital behind them, to introduce new methods of baling cotton in a manner to overcome the many serious objections to the prevailing methods.

These efforts have stimulated the old compress companies to the consideration of more uniform methods for themselves. A movement is now on foot to organize these companies into a trust, or some other form of association, to combat these innovations that are now being introduced and urged upon cotton planters and transportation companies. The round bale system is looked upon with much well-founded fear as likely to monopolize the baling of the cotton crops. The idea is to put these old cotton com-

press companies under a single or one directing management capable of reducing expenses by the adoption of economical methods of establishing a uniform or standard sized bale, of obtaining lower rates of insurance, and of securing lower rates of freight to foreign and domestic points.

These companies, according to official announcements, are confident "that unless a consolidation can be arranged or a proposition made, on this basis, they may not be able in the long run to successfully compete with the round baling systems of other new trusts which may come into the field." It is stated that there are over 200 square bale compresses.

The officials of the State of Texas, where queer things take place, in legislation, have undertaken, under a recent law, to prevent round bale compress companies from doing business, alleging that it is contrary to public policy. The law was framed and is now being forced in behalf of the old square bale compresses in which is invested a large amount of Texan capital. More has been done in this State than in any other for establishing a uniform or standard sized square bale, 24 by 54 inches. This size has been generally adopted as the standard throughout the South, for this shaped bale, weighing in the neighborhood of 500 pounds, at a density of 25 to 30 pounds per cubic foot.

The efforts that have been made in this direction during this last season have given the average density of the cotton bales, passing through the port of Galveston, at about 24½ pounds per cubic foot against 22½ pounds last year. Even this small difference in density amounted, it is said, to a reduction in the transportation cost of the Texas crop of nearly 25 cents per bale, making a total estimated saving of $600,000 in such charges alone.

The square bale for transportation is far superior to the round bale. What part the Dederick square bale will play in the future baling of the cotton crop it is impossible to say at this moment, but we understand that determined efforts will be made to push this system of baling for all it is worth with every argument that can be set forth, and there are not a few arguments that can be readily brought to its aid.

Business of this country is in a remarkably prosperous condition, as shown by the small number of failures for the first six months of the current year, those for the last quarter being the smallest ever reported in any corresponding quarter for the last twenty-five years at least. The average per failure is $7,165, that being the smallest ever known in any quarter, the average per firm in business being $12.20.

The railroads also show in their earnings the splendid condition business is in, being the largest ever before known. In the textile lines, manufacturers are doing all that can reasonably be expected; the price for woolen goods advancing in harmony, though not to the full extent, with the advance in the price of the raw material. The prices for woolens are higher than at any time since January, 1898. Speculation regarding the size of the growing American cotton crop still continues with various estimates, but the general contention is that a crop of 11,000,000 bales is needed to meet the consumption of the world.

The world's production of raw silk has been greatly increased of late years. The estimated production for the current year is placed at about 36,000,000 pounds against 34,000,000 last year, and 21,200,000 pounds, as the average of five years, for 1881-85.

ARTIFICIAL COTTON.

We see references in some of our foreign exchanges to what is denominated artificial cotton, made from the wood of the fir tree. In order to prepare this wood and convert it into a

fibrous condition, it is subjected to washing and steaming, and then to a strong preparation of sodium lye, and heated under great pressure for a number of hours. The wood is said to be converted into pure cellulose. The object to be accomplished is to furnish a substitute for cotton, at a lower price. We speak of this case not because of its great importance (for, in fact, we believe that it cannot amount to anything), but because of a similar attempt which has been made in the state of Oregon for converting the needles of some species of the pine to a fibrous condition, freeing it from gum and resinous matter, and otherwise preparing it for textile use. Samples of what has been accomplished have been sent to us for examination, and they certainly impressed us, at first, most favorably, until we submitted them to analytical investigation and found that instead of consisting altogether of fibres of the pine needle, they contained a very large proportion of cotton. When we called the attention of the manufacturer to this apparent deception, he admitted the mixture, though at the time the samples were sent to us the evident purpose was to make us think that all of the fibres were from the pine needle. These frauds are so often perpetrated that we should not be surprised if this artificial cotton, referred to in our foreign exchanges, was found to be made up in like manner.

TECHNICAL EDUCATION.

The success of technical education on textile lines in this country seems to be more assured than in Great Britain, in the fact that more attention is given in our common school system to what is termed secondary education, which is particularly lacking in the English system of free school instruction. The elementary subjects are sufficiently well handled and practically confined, in the free schools of that country. Until the free school system of England is extended to the secondary, or intermediary, subjects, the general influence of technical education will suffer to a greater or less extent. This is realized by the manufacturers of England, and they are now urging upon the government the extension of free education, so as to take in these secondary subjects, and, therefore, better prepare young men to take up the proper topics for study in the technical schools. The British government has done a great deal towards the encouragement of technical education on industrial lines, and has provided funds, to some extent, for this purpose, but has left the employment of these funds to local authorities. This is apparently, in the abstract, the proper thing to do, as it is supposed that the authorities of the localities in which the schools are located are in a position to better judge of the necessities that are to be provided for. The fault of such a system lies in the tendency to wastefulness of the money which comes from the general government. The United Kingdom expends annually a sum exceeding $4,000,000 towards the support of technical education. This, however, does not represent, by any means, the total expenditure for such a purpose, as it is largely promoted by contributions from other sources, the most conspicuous one of which is the City and Guild of London Institute for the Advancement of Technical Education, an institute that is free from governmental control and is sufficiently powerful and liberal in the distribution of the funds at its disposal to direct and practically control the national system of technical education. It maintains a system of technological examinations similar to those that have appeared in these columns in our Cotton Department, from time to time, an example of which is given in this issue. The certificates that are given to the successful competitors in these examinations are not only valued by those who obtain them, as showing efficiency, but are taken as passports for securing desirable positions.

The Cylindrical Cotton Bale.

IMPORTANT DECISION OF THE UNITED STATES COURT.

The Court of Appeals of the District of Columbia has rendered a decision which has occasioned more or less discussion, affecting some of the patented features of the compress for making a cylindrical cotton bale, operated by the American Cotton Company. The case in contest involved a single application of a patent of Thomas J. Griffin, filed January 14, 1896, and the two applications of Magnus Swenson filed on April 11, 1895, and October 14, 1895, respectively. The important question involved was that of priority relating to certain inventions for the manufacture of the cylindrical cotton bale process. The court decided by giving to Swenson, or the American Cotton Company, priority "in the three-roll press invention," and to Griffin priority on the "continued process claim."

The value of the claim granted to Griffin is in the alleged fact that it is not practicable, commercially, to operate a single press for the manufacture of cylindrical cotton bales, inasmuch when a single press is run, it requires a stoppage each time a bale is formed, covered and discharged from the press. Each stoppage necessitates shutting off of the gins and condenser, an operation highly unprofitable and burdensome. To overcome this defect, the idea of running two presses and feeding the bat of cotton to either one, and shifting the feed alternately from one to the other, was evolved, and thus the process of forming a bale on one press may go on, while a previously finished bale is being removed from the other.

The two separate interferences have been declared and maintained for the reason that while the single application of Griffin embodies the issues of both interferences, the two applications of Swenson each present different subject matter, and are in separate interferences; the first application, including a press of three rolls as the working elements without the disclosure of a feeding device, and the second application, illustrating a press of four rolls (or two presses of two rolls each), with a feeding apparatus to enable the presses to be worked alternately; that is to say, according to the argument of the attorneys for Griffin, the single application of this inventor's device contains substantially all that is embodied in the application filed by Swenson. The issues before the court are presented in its opinion given below.

E. L. Siggers, Washington, took an active part in the case for Griffin, and a large portion of the success in the latter's behalf is due to his efforts and legal attainments in handling patent cases.

With this we give a sectional illustration of the cotton press of the American Cotton Company, covering the feeding device involved in this case. This will be seen at "A." In order that the several parts of this machine may be better understood, we call attention to the diagram:—"a" is the lint flue; "d d," bat-former aprons; "e e," compression rolls; "f f f f," baling rolls; "m," bat-former pulley; "u," swinging chute.

We are informed by the American Cotton Co. people that this decision is not final; in fact, application for a rehearing has already been filed which they think will be granted.

The company has three or four courses to pursue before final settlement—appeal to the Supreme Court, writ of certiorari to that court or by a bill in equity in one of the circuit courts.

A protest can also be presented to the commissioner of patents against the issue of a patent to Griffin based on the question of inoperativeness, which protest must always be considered.

It is believed that a perfectly operative device can be made which will avoid the claim of any patent which Griffin can secure, in fact the mechanical department of the American Cot-

ton Co. has already tested a new device overcoming the Griffin patent which works perfectly.

American Cotton people say that in case of a suit for infringement they believe they will prevail on the merits of the case, since a patent granted to Griffin would be of very doubtful validity since the idea of alternately feeding a bat of cotton to two cotton presses is very old in connection with the making of square bales.

They declare that the device will be of no value to Griffin because of the decision in their favor deciding his press to be an infringement upon the American Cotton patents and an injunction would probably be obtained against him if he made an effort to utilize his device.

In any event, it is not believed Griffin could secure his patent for a year, hence for the present crop the American Cotton Co. could not be molested, and it has ample time in which to make any changes desired should changes become necessary.

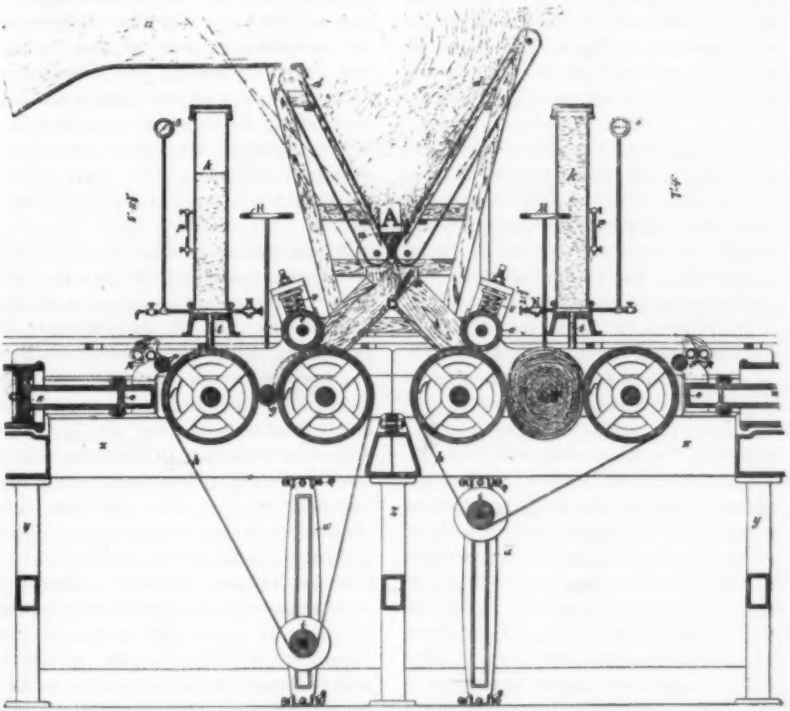
The opinion of the court is as follows:

These are companion appeals (numbered 116 and 117) from companion decisions of the Commissioner of Patents in two cases of interference respecting cognate inventions.

In cause No. 116 the issue comprises two claims, which are stated in the following terms:

"1. In a cotton compress, three compressing rolls having their axes substantially in line with each other, mechanism for operating said rolls to provide for the formation of a bale alternately between the intermediate roll and each of the other two rolls, and a core rod supported at each side of said intermediate roll.

"2. In a rotary cotton press, the combination of a stationary compression roll, compression rolls movable towards and from said stationary roll, movably supported baling spools arranged, one between the stationary



AMERICAN COTTON CO.'S COTTON PRESS.

roll and each movable roll, means to hold the movable rolls yieldingly in contact with their respective baling spools or the bale formed thereon, and means to rotate said compression rolls, substantially as described."

And in cause No. 117 the issue, which comprises only one claim, is as follows:

"The combination with a single batforming apparatus of two sets of rotary cotton-pressing appliances, and means for feeding the bat to either one of said appliances and for shifting the feed from either one to the other, whereby the process of forming a bale in either one may go on while a previously finished bale is being removed from the other."

As is apparent, both inventions have reference to the same subject matter, the process of baling cotton; and the issue of interference cause No. 117 seems to express a generic or broad claim, while the claims of cause No. 116 are more narrow and specific.

The claims of cause No. 116 were first stated in the patent office, so far as the record before us discloses, in an application for a patent therefor filed on April 11, 1895, by the appellee Swenson. And the claim of cause No. 117 was made the basis of another application filed by the same appellee on October 14, 1895. He claims to have conceived both inventions in February of 1895; to have made complete working drawings of the subject matter of his claims in the first application on or about April 13, 1895; and to have made complete working drawings of the subject matter of the claim of the second application about October 10, 1895. He admits that he never made any model of the claims of the first application, and that he never embodied the inventions there claimed in any working machine. But he alleges that, about the time of his second application or shortly thereafter, he embodied the claim of this second invention in a full-sized working machine, which was exhibited at Atlanta, in the State of Georgia, during the months of November and December of 1895.

The appellant Griffin did not file his application in the patent office until January 14, 1896. His application then filed included all three of the claims in controversy; and his preliminary statements, filed in pursuance of the several declarations of interference, alleged conception by him of both inventions in September of 1890, the completion of a model by him in January of 1891, which was afterwards accidentally destroyed, and disclosure by him in July of 1891. He had made at the time of the application no full-sized machine embodying the invention or any of the claims now in issue; but he had executed a new model, and at the time when his preliminary statements were filed, he had a full-sized machine in course of construction, which was soon afterwards finished and put into actual operation.

It appears, therefore, that there was no actual reduction to practice by either party before application to the patent office: and all the tribunals of the patent office have so found. But the appellee Swenson, being the first to file his application in both cases, is entitled to the benefit of the first constructive reduction to practice. And the burden, therefore, was upon the appellant, as the junior applicant, but claiming to be the first to conceive the invention, to show that he was in the exercise of due diligence when his rival entered the field and down to the time of his own application to the patent office. This is the principal, and perhaps the only question in the case; and upon this question all the tribunals of the patent office, while finding that Griffin was undoubtedly the first to conceive the invention, awarded judgment of priority to his rival Swenson.

From the decision of the Commissioner to that effect Griffin has prosecuted the present appeals.

With reference to the claims involved in clause No. 116, we find no good or sufficient reason to come to a conclusion different from that reached by the tribunals of the patent office.

It appears to be quite certain that the appellant conceived the invention stated in these claims as early as the year 1890, and made disclosure of it in the same or the following year, thereby anticipating the appellee by upwards of four years. It also appears quite satisfactorily that, in the years from 1890 to 1895, he had to struggle with many troubles and difficulties, poverty, debt, sickness, the death of his wife and sickness of some children, and various domestic sorrows. But while circumstances of this kind tend to excuse delay, they will not justify indefinite postponement of action for a period of years. For to allow them to have that effect would be in many cases to close entirely the field of invention against competition and to nullify the purposes of the law.

Under these circumstances we can see no reason why the well-established rule should not be applied, that to him who first reduces an invention to practice, even though the reduction to practice be merely constructive by the filing of an allowable application for a patent belongs the right of priority of invention, as against one prior to conceive, but who has failed to follow up his conception with reasonable diligence.

We are of opinion that there was no error in the decision of the Commissioner of Patents awarding judgment of priority to the appellee Swenson in the matter of the issue involved in cause No. 116.

With reference to the issue involved in cause No. 117, a somewhat different condition of things is presented. It does not follow, in our opinion, that the judgment in this case must necessarily be governed by the decision in cause No. 116.

In cause No. 117 the appellee Swenson filed his application for a patent on October 14, 1895; and we fail to find in the record any sufficient or satisfactory proof of his conception of the invention at any time before the date of that application, or at all events, before the petition was sworn to before a notary public on October 5, 1895. It is true that he testifies to such conception and to disclosure of the invention in the preceding February or March; but we do not find sufficient corroboration of his testimony, and there is strong negative evidence to the contrary. There would seem to have been no reason why it should not have been included in the first application, if he had the conception at that time, as he claims to have had. We must, therefore, regard October 5, 1895, as the earliest date of conception that can be allowed to the appellee for the matter contained in the claim of cause No. 117.

Nor that the appellant had the same conception since 1890 or 1891, can scarcely be doubted upon the record before us. The question then arises whether he was in the exercise of due diligence on and before October 6, 1895, when the appellee must be held to have entered upon the field of invention, so far as the claim of this cause is concerned.

In September of 1895, the condition of the appellant was changed. He had put an end to his period of inactivity, and had renewed his efforts to promote his invention. He entered into an agreement with one Reidel, and through Reidel with a banking firm in Galveston, Texas, his place of residence, for financial aid to test his invention and to procure a patent therefor. He was at the time, and continued to be for several months thereafter, a traveling salesman for a company known as the Rembert Lint Cotton Cleaner Manufacturing Company; and it was his business to travel through the State of Texas and to sell and locate the machines of that company. He was compelled to be away from his place of residence much of the time, and had no great opportunity to consult with those who had agreed to extend financial assistance to him; and during one month of the time he was detained at the bedside of a sick wife; for it seems that he had married the second time. And yet during these months from

September, 1895, to January, 1896, he proceeded to have drawings of his invention made by a draftsman, to make a model of it himself, substantially a reproduction of a model destroyed in 1892 or 1893, and to have everything in readiness for his visit to Washington in January of 1896, when he consulted patent solicitors and made his application for a patent, as already stated, on January 14, 1896. This was the culmination of his arrangement of the preceding September with Reidel. We can not think that he was wanting in due diligence during this period; and if he was not so wanting, he was entitled to the benefit of his prior conception as against any person who entered the field of invention during its continuance, as did the appellee Swenson with reference to the present issue. For plainly we can not attach importance to the machines previously exhibited by Swenson at Atlanta, since no machine involving the present issue was constructed, or sought to be constructed by him before the date of his application for a patent (October 14, 1895).

We have heretofore had occasion to remark that the law encourages such delay as is required to test the thoroughness and utility of supposed inventions, and to prevent the patent office from being overloaded with applications for patents for crude and incomplete devices. And we have also said that the law fosters diligence, for the reason that an inventor is always bound to anticipate that a rival may appear upon the field at any time. But neither the delay that is proper in the one case, nor the diligence that is due in the other, can, in the absence of any statutory limitation of time in this regard, be measured by any arbitrary standard. It has been repeatedly held that the question of due diligence is one to be determined in each case by its own circumstances. And while less harm is done and the policy of the law better promoted by a rigid insistence upon the requirement of diligence than by laxity in the encouragement of delay, it does not seem that the rule of diligence should be pushed to a harsh and unreasonable extent. A shorter delay even than one of four months, if consumed in inaction, might suffice to sustain a charge of laches; but a period of four months expended in reasonable activity—and what the law requires is reasonable, not extraordinary activity—is not an unusual time to expend in preparation for an application to the patent office. Although there is no question here as to a race of diligence between the parties, the appellee himself waited for eight months without any apparent cause before filing his application, if we are to regard as correct the statement that he conceived and disclosed the invention in question as early as February, 1895. For one placed in the position of the appellant we can not consider that any laches are to be attributed to him for his course between September, 1895, and the date of his application for a patent. We think that the tribunals of the patent office were led into error by commingling, and practically confounding, the two causes, and charging the appellant in both cases with the delays which it was proper to charge to him only in one of the cases.

For the reasons assigned we think that the Commissioner's decision in cause No. 116 should be affirmed, and that judgment of priority of invention in that cause should be awarded to the appellee Magnus Swenson; but that the decision in cause No. 117 should be reversed, and judgment of priority of invention there awarded to the appellant Thomas J. Griffin.

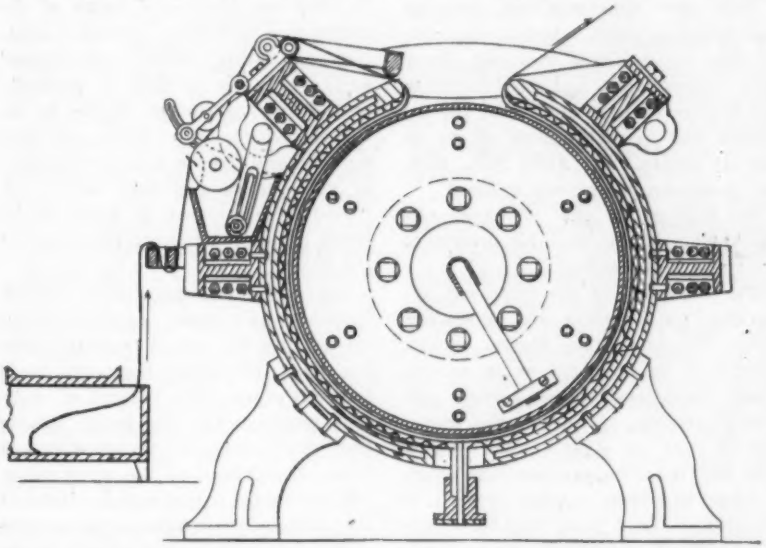
—The valuable properties of the fibre produced by the silk-worm, which render it of such high importance in textile manufactures, have naturally directed the attempts of many more or less successful inventors towards the production at a low cost of a fibre which shall partake of these properties, and which may replace natural silk in its various applications.

A New Apparatus for Pressing and Shrinking Cloth.

(Reported by the European Pattern Supply Co., 32 Greene St., New York.)

The most difficult part of manufacturing textile fabrics is the process of finishing. A large number of manufacturers who make good cloth have not the necessary facilities, in many cases not the knowledge, to give their fabrics such a finish as to make them worth their value, whereas other manufacturers, who are equipped to make only cheap goods, have so well established finishing departments that they can demand a comparatively more profitable price for their well finished low grades. Finish is everything. Offer a consumer a pure worsted, poorly finished, and a cotton mixed worsted, which in price and construction is naturally much lower than the former, and apply to the latter a good hard finish and the consumer will surely prefer the cotton mixed fabric. The same applies to kerseys, meltons, beavers or any other article. Beavers are made in England from the very cheapest raw material, and prior to the Dingley tariff, we have seen thousands and thousands of pieces landed in this country which had ready sale in competition to our American makes, simply owing to their good appearance, which is due to the high finish which the English manufacturers apply to their goods.

Since the enactment of the present tariff, great efforts have been made by domestic manufacturers to replace the English beavers, but we have heard of little success so far. The same observation has been made between European and American cassimeres, and only the best equipped mills in this country turn out cassimeres with the fine velour finish which is in vogue in almost every mill on the European continent. This condition is certainly due to the lack of proper machinery. A great number of manufacturers are handicapped in making desirable cassimeres and fancy worsteds because they have no facilities for twisting yarns, and, as we said before, an astonishing large number cannot apply the proper value to their merchandise, for the reason that their finishing machinery is not of the latest type.



A short time ago we had occasion to illustrate to one of our leading manufacturers the method of creating the well-known Saxony finish, and we were surprised to find that though

this gentleman was highly interested in our conversation, he was ignorant in so many points that we could not conceal our astonishment, whereupon he informed us that there was very little chance of learning about the progress which is made in manufacturing centres in the old world. We do not intend to investigate to what extent this statement is justified, but we have no doubt that a large contingency of manufacturers and commission men will be glad to have their attention drawn to improvements of manufacturing on the other side, which generally are due to new inventions of machinery.

This new apparatus for pressing and shrinking cloth, which is the topic of this article, was invented about two years ago, and the demands for it have been so large that the inventor had to make great efforts to fill all orders. On April 25th, 1899, the American patent was granted.

In illustrating the working and mechanism of this valuable invention, we state the following:

The invention of the improved apparatus for pressing and shrinking cloth, felt and other similar woven fabrics is so arranged as to enable these operations to be carried out simultaneously. Hitherto, the pressing of cloth or other similar fabrics has had the disadvantage that when a fabric had been properly pressed, it received a hard and unfinished appearance. To avoid this the pressure had to be made lighter, whereupon the fabric received a softer appearance, but one that was not durable. The least contact with rain or dampness would spoil this finish and make the fabric incomplete. The object of this invention is to remove these disadvantages by enabling the cloth to be so pressed and shrunk that it is complete in all respects and to give to it a finish or gloss which will not disappear by being made wet or upon being ironed.

The new process consists essentially in moistening the whole of the upper surface of the fabric in an equal degree and then applying the pressure by means of a cylinder press, whose outer mantel is heated by steam and whose inner cylinder can be heated by steam or gas. Between the inner cylinder and outer mantel of this press is an elastic press-mantel between which and the cylinder proper the fabric is pressed or drawn. The elastic press-mantel is provided with steam chambers and perforations, which allow steam to be ejected directly on to the fabric simultaneously with the pressing action, which latter can be effected by air, steam or hydraulic pressure. The effect of this is to keep the fibres and hairs of the fabric in a moistened condition while they are being heated and pressed and the result is that a perfectly pressed and shrunken fabric is obtained, which is at once soft and durable and whose superior finished or silky appearance will not be affected by dampness or fluids or by being ironed after being taken out of the press.

The method of operation of the invention is as follows: After the apparatus is set in motion from the driving shaft, the fabric begins to move into the press. The amount of moisture required for the fabric having been determined, the pressure of said fabric is regulated on the water roller. The moistened fabric is then stretched laterally, after which it enters the press. As soon as the elastic press-mantel is filled with steam, water or air it commences to press with its outer corrugated surface against the outer double mantel and with its inner smooth surface against the rotary cylinder. The fabric is then put between the inner surface of the press-mantel and the circumference of the rotary cylinder. This causes the circumference of the inside of the press-mantel to be somewhat lessened; but this is equalized by the increase of the other corrugated surface. The press-mantel is moved with the rotary motion of the cylinder until its end is

tight against the round end of the double outer mantel at the point where the fabric enters the press, and it then incloses almost the whole of the cylinder and presses the fabric against this.

In working with a pressure of up to two atmospheres, the machine can be kept working continuously; but if a higher pressure is used, say to five or more atmospheres, the friction of the fabric on the inner surface of the press-mantel becomes so great that it needs great power to turn the cylinder. In this case the cylinder can be worked intermittently, for which purpose the variations of pressure can be automatically regulated.

If it is desired to shrink the cloth while pressing it, steam is ejected on the same while it is being drawn around the press with the rotary movement of the cylinder. This steam is ejected from the steam chambers of the elastic press-mantel through perforations in the inner surface of said press-mantel, as previously explained, and has the effect of keeping the hairs and fibres of the fabric perfectly soft while being pressed flat, and in giving the upper surface of the fabric a firm, but soft and glossy appearance.

The accompanying cut is a cross section showing the cylinder and press-mantel.

Style Suggestions for Woolen Manufacturers.

The coming spring season promises to be an exceedingly large, and also to contain many surprises for buyers. This is to a large extent foreshadowed by the conditions prevailing in the heavy weight market, and a review of these will undoubtedly prove of interest to the manufacturer.

The entire change in the method of doing business has made the conditions entirely different. Some few years ago it was the custom of the trade to buy large enough quantities, or at least to place orders for what they considered yardage enough to carry them through a season, and if they sold that amount from the sample piece, the order would be taken, but if not it would be cancelled, and the stock left on the maker's hands.

Some few seasons ago clothing manufacturers speculated to a large extent, and many of them were left with large stocks. Experience, however, has changed the method of placing orders, it being the custom now to order a sample piece of a style, and after garments have been sold to place duplicate or repeat orders. In this way the initial business is small, as was the case this season, but the duplicates have been very satisfactory.

The prevailing impression at the opening of fall goods was that high priced coverts would not sell largely and that kerseys were a back number, but this has been nullified by the results.

The various lines of high priced fancy back coverts sold largely, and many duplicate orders were placed, and are still being given, after considerable raise in price.

The medium grades of fancy back coverts have not sold largely, the demand being for either a real cheap one or a high grade fabric, and the prevailing shades sold have been the olives and grays, principally the grays.

Kerseys are in demand and the same is true of these as of coverts, the principal business being done on the cheapest and best grades. The kerseys at a dollar are almost entirely cleared out, and around this price there is a fair field for an "all wool" fabric.

There is also a demand for light colored kerseys at $1.30 of about the same grade as the Washington Mills are sold upon. This fabric would pay to investigate, but the colors would have to be clear and light. Kerseys are selling much more freely than at the opening, and are in demand, more than coverts or vicunas, which were to take their place.

The vicuna fabric has been made in all prices from $1.12½ to $2.12½, but the largest demand has been for fabrics around one fifty, and here, as in the coverts, the grays have been the principal sellers.

While the heavy weight market is firm and a rising one, there seems to be no inclination to speculate, except in the clay and serge fabrics, and the mills which have opened these light weight fabrics have raised their prices in every instance.

It is the general feeling among the trade that manufacturers who open their lines early will not be able to cover themselves later at the present price of wool, and the feeling generally is for as late an opening of new light weights as possible. The light weight season bids fair to be almost entirely a worsted season, and it seems almost certain that every mill which can make worsteds will be on them. This fact will make the position of a good cassimere manufacturer all the stronger, for there will undoubtedly be a large demand for cassimeres for the few mills which are making them, and the less competition the better prices obtainable.

The coming demand is for stripe suitings, and while neat checks and plaid will sell some, the volume of business will be done in stripe suitings, and these, while they should be neat, can be broad, if the colors are such that the pattern is subdued. These stripes will be sold principally in worsteds, but they will also be demanded in cassimeres, particularly in twist ones, and these fabrics will sell in volume next to worsteds.

There is also a tendency to use a light weight vicuna for suits, and while there is nothing to the pattern of these except a plain twill, the colors will be everything and the remarks applicable to the coloring in these are also for all other light weight fabrics.

The latest colorings and those which have come to stay are the gray mixes, and in all lines there should be three mixtures, one closely approaching a white, the second a medium, and the third almost a black. These with several olives and stone drabs will be the principal colors, the grays having the preference.

Cloth Pressing by Electricity.

At a recent meeting of the Industrial Society of Elbeuf, a report was made by M. Ch. Mouchel, on a new process invented by M. Chedville, which is known as the "electro-calidor" process, and consists of pressing cloth by means of boards heated by electricity. A special committee, appointed for the purpose, examined the manufacture and operation of the press boards. The result is declared to be most satisfactory, and the report, according to the United States Consul at Roubaix, is as follows:—The body of the press board is composed of asbestos paste covered by a netting of German silver. This is again covered by paper pulp, which gives a pliable surface without materially increasing the thickness of the press board, which measures from two to four millimetres (.071 to .157 inch). The first experiments were made by applying the electric current through holes pierced in the portion of the board projecting beyond the cloth. Experience, however, has led to the adoption of press boards with a trapezoid projection, of which the two obtuse angles are covered with copper. Spring clips provided with a metal connection and attached to a pliable conductor serve to transmit the electric current to the copper-covered corners of the boards, when the press is arranged for work. The electric press boards are used in the following manner. On a plate of sheet iron is placed a piece of cloth, between the folds of which are placed at equal distances three electric press boards; then there is another plate of sheet iron, another piece of cloth, and so on, until the press is full. An ordinary press holds eight pieces, the folds of the cloth being one metre (39.37 inches) wide. One of the largest firms of Elbeuf employ a system of hollow presses, and an

iron track, sufficiently long to accommodate ten, communicates with each one of their hydraulic presses. Against the ceiling, and parallel with this track, are arranged two conductors, one positive and one negative. They are placed on either side, and a little beyond the line of the track. Large clips for transmitting the electric current are attached by pliable wires to these conductors. The hollow press is then placed between two of these clips, each of which communicates with a movable vertical distributor. The distributor is a simple grooved rod, the conductor being placed in the groove. Thirty pliable wires, each terminating in a spring clip, hang at an equal distance from this distributor. The clips are readily adjusted to the metal corners of the electric press boards, the positive on one side and the negative on the other. The current is thus established and the proper degree of heat generated, the time necessary varying from three-fourths of an hour to one hour and a half. The required current for a press board measuring one metre (39.37 inches) by 70 centimetres (27.5 inches) is 2 amperes under a pressure of 110 volts. A press of eight pieces, with twenty-four press boards, demands a current of 48 amperes to heat the press, and the amount of electric force expended in one hour and a half is as follows:— $48 \times 110 \times 1.5 = 7{,}920$ watts per hour. The mechanical force given a dynamo of 90 per cent. working capacity is 12.5 horse-power. The labor expended in one hour and a half is as follows:—$12.5 \times 1.5 = 18.75$ horse-power per hour. Supposing a consumption of 1.5 kilogrammes of coal per horse-power per hour, the quantity of coal necessary to heat a press may be estimated at about 30 kilogrammes (66 lbs.). Estimating coal at 25 francs ($5.00) per ton, the maximum cost of heating a press would then be about sevenpence. Comparison being made between the amount of coal required by the new system of pressing and the old—viz., direct heating in a special oven by means of sheet-iron plates interspersed between the folds of the cloth—it is found that the old method is slightly dearer than the new, as the firm referred to above, who used the old system with as little waste as possible, and had thirty presses per day, state that they use at least a ton of coal a day for the heating of their plates, which involves an expenditure of 33 francs ($6.50) for the presses used, or 1.10 francs (21 cents) per press. There is thus an economy of fuel: but the new system has other and more important points of superiority. The first is the perfection of the work. The heating of each press, and even of each piece, can be regulated mathematically, either by varying the number of press boards, or by increasing or diminishing the length of the heating. The cloth is heated slowly and without the inequalities resulting from the old system under which the two ends of each piece were almost in contact with plates heated to 500°. All manufacturers who have employed the new system speak of this point as a great advantage. A second advantage is the extreme cleanliness with which the pressing can be effected. The old style of plates heated in an oven often resulted in soiling the cloth, which is now entirely avoided. Another advantage is the economy in laborious handling necessitated by heating and transporting heavy cast-iron plates. The workshops can also be kept at a lower temperature, more favorable to the health of operators. The heat generated in the folds of the cloth is completely utilized by the new process, and a fraction less is lost by radiation than under the old system of heating by plates. If there is already an electric plant in the establishment (and few modern houses devoted to commerce or manufacture are without one) the expense is reduced. The boards are not costly, and with proper care will last several years. M. Mouchel thinks that the process above described is from all points of view a most important invention, and one which should be generally adopted.

Continental Cotton Oil Company.

A COMBINATION.

The prospectus of the Continental Cotton Oil Company was issued last month, on the 15th. The company is capitalized at $6,000,000 and is a consolidation of the seven following mills: The Paris Oil & Cotton Co. of Paris, Tex.; Corsicana Cotton Oil Co., Corsicana, Tex.; Central Texas Cotton Oil Co., Temple, Tex.; Waxahachie Cotton Oil Co., Waxahachie, Tex.; Ladonia Cotton Oil Co., Ladonia, Tex.; Shreveport Cotton Oil Co., Shreveport, La.; and Jackson Cotton Oil Co., Jackson, Miss.

The capital is equally divided into $3,000,000 seven per cent. cumulative preferred stock and $3,000,000 common stock, of which there has been issued $1,412,500 of preferred and $3,000,000 common. The prospectus further states that "the Continental Cotton Oil Company has acquired nearly ninety-nine per cent. of the entire capital stock of the corporations owning and operating the seven plants mentioned in the accompanying statement of manufacturers. These plants are unencumbered and free from debt, except that the newly completed plant at Jackson, Miss., is subject to an unmatured debt of $36,000, part of its construction account, and the payment of which has been assumed by certain individuals and secured by deposit with the Knickerbocker Trust Company of preferred stock of the Continental Cotton Oil Company of the par value of $75,000 and a like amount of its common stock.

The late stockholders of the constituent corporations have received, in exchange for their interests, stock of the new corporation, no cash having been paid them therefor.

The entire amount of cash to be realized from the subscription and sale of stock hereby offered is to be paid into the treasury of the new company, and used for the acquisition of new plants and for working capital.

The board of directors of the company is composed as follows: C. L. Rathbone of C. L. Rathbone & Co., bankers, New York city; H. L. Scales, Secretary and General Manager of Corsicana Cotton Oil Co., Corsicana, Texas; J. J. Culbertson, General Manager of Paris Oil & Cotton Co., Paris, Tex.; R. K. Irwin, Secretary and General Manager of Waxahachie Cotton Oil Co., Waxahachie, Tex.; A. J. Buston of A. J. Buston & Co., cotton merchants, Liverpool, England; Alfred Hood, Liverpool, England; A. C. Van Gaasbeek of Van Gaasbeek & Co., Orange, N. J.; W. G. Nunn, Secretary and General Manager of Ladonia Cotton Oil Co., Ladonia, Texas; J. S. Leclercq, Secretary and General Manager of Jackson Cotton Oil Co., Jackson, Miss.

The officers are: C. L. Rathbone, President; H. L. Scales, Vice-President; J. J. Culbertson, Secretary and Treasurer; Counsel, Davies, Stone & Auerbach; Trustees, Knickerbocker Trust Co.

Subscriptions to preferred stock at par receive as bonus 50 per cent. in common stock.

A statement bearing the signatures of representatives of the mills included states that "the seven mills have an aggregate crushing capacity of 930 tons of cottonseed per day, and an aggregate capacity for refining 1270 barrels of oil per day. With the construction and acquirement of the additional plants with the new capital obtained by sale of stock, this crushing and refining capacity will be practically doubled, or, say, 2000 tons of seed and 2500 barrels of oil daily, and the net profits of operation be more than correspondingly increased.

"During the last two years the average net earnings from the six companies whose property and good will are now to be acquired by the corporation (exclusive of the plant at Jackson, Miss., only completed this year), as certified to by the respective manufacturers, amounted to more than $240,000. This alone would pay the 7 per cent. dividend upon the pre-

ferred stock—$193,375 per annum—and provide a fund applicable to a dividend upon the common stock.

"It is safe to say that by the use of the $1,250,000 cash capital to be derived from the proposed sale of stock, the profits to be distributed among the holders of the common stock will certainly amount to a sum sufficient to insure dividends at the rate of at least 8 per cent."

Going to Georgia.

At the last session of the New Hampshire legislature a private act was passed granting authority to the Stark mills of Manchester to purchase land and erect buildings thereon in other localities outside of the State. Under this authority, supplemented by authority of the directors of the corporation, the Hon. Stephen N. Bourne, agent, and Sidney Coolidge, treasurer, have been making a tour of the southern States, looking over such properties as might be offered, and with the object in view of purchasing land and erecting mills. They visited mostly among the cotton growing States, and from the impressions received are inclined to favor the State of Georgia as affording better advantages than any other section of the South.

The laws of Georgia are said to afford greater protection to industries than the legislation of any other State. The Stark corporation has a trademark of great value, and the security afforded by the laws of Georgia is of the strongest character.

Messrs. Bourne and Coolidge were given the refusal of certain tracts of land in different localities, and at a meeting of the directors of the Stark corporation in the near future a report will be presented.

In speaking of the trip, Agent Bourne stated that in order to protect the trademark the company had arrived at a point where means must be taken to get nearer to the base of supplies. "This does not mean," said Agent Bourne, "that the entire plant will be moved to the South, but that certain portions of the product must be manufactured nearer where the cotton grows than at present, and where coal and labor can be had cheaper than in the North. The probability is, in case this new mill is erected, the manufacture of the coarser grades of goods will be done there."

Mr. Bourne further stated that it was his opinion that the mills in Manchester would always continue to exist and that it would be unwise to move the entire plant.

Thomas & Prevost Mercerizing Patents.

An important decision has just been made by the German Imperial Patent Office, setting aside the Thomas & Prevost patents, the American rights of which are owned, it is said, by a company recently formed under the name of the American Mercerized Yarn Co., which is reported to have paid $750,000 for them. The ground upon which this decision was made was the priority to the Lowe patent taken out in 1890. This decision is likely to have considerable influence upon the methods and development of the mercerizing industry. Briefly stated, mercerizing was discovered and introduced by John Mercer in 1850, but the process in use today is entirely different in its object from the original aim of Mercer. His plan comprehended the shrinking of the fibres, while the process of mercerization as in vogue today is for the purpose of producing a silky luster upon the fibres and the cloth.

The process has reached such a stage that the product thereof can with difficulty be distinguished from silk. Numerous and varied designs are produced, and mercerizing is clearly destined to play an important part in the cotton manufacturing business.

The process entered upon its present stage of development in 1884, when a patent was taken out by P. and C. De-

poully, of Paris, and C. Garnier and F. Voland, of Lyons, at the German Patent Office, June 14, 1884—No. 30,966—supplemented by No. 37,658, of Dec. 13, 1885.

These refer chiefly to the production of crape by mercerization. On March 15, 1890, Horace A. Lowe took out an English patent (No. 4,452) for the treatment of cotton or linen, whereby the fibre is improved in luster, in strength, and in power of combining with dyes. Protection in Germany and elsewhere was also secured. Other patents were taken out about this time by other inventors in England and abroad, the object being the production of crape and crepon effects.

Now follow the important patents of Thomas and Prevost, of Crefeld—the German patent No. 85,564, of March 24, 1895, the French patent No. 246,244, of March 30, 1895, and the English patent No. 18,040, of Sept. 26, 1895. These patents deal with the mercerization of fibres in a stretched condition. The specifications refer to the increased affinity for dye, which cotton acquires by mercerization, and the advantage that can be taken of the fact in particolored dyeing of mixed fabrics.

Previously such wares were dyed in the hank, or the cotton was first dyed a fast black, was woven with the raw silk, and then put into a fresh bath in order to dye the silk. If a fabric containing silk and mercerized cotton be dyed in a weak bath, the former will only be lightly colored, but the much greater affinity for the dyestuff possessed by the cotton will cause that to give it a far deeper shade. By these means, and also by weaving together mercerized and unmercerized cotton, many different effects can be produced.

The patentees proceed to point out that all these shrinkages are made of no avail by the shrinkage of the mercerized stuff, and propose to prevent that by keeping the fabric or yarn stretched during mercerization at a sufficient tension to prevent any contraction, keeping up the stretching until the subsequent washing out of the lye or acid has been completed. When this is done, the mercerized material can be used without any fear of subsequent shrinkage setting in, and it has the same affinity for dyes as if it had been allowed to contract.

This important patent is now declared by the German Imperial Patent Office to be null and void, the decision being confirmed by Imperial authority, dating as from Jan. 21, 1899. The decision is based upon the fact of the priority of Lowe's patent of 1890, referred to above, although the German licensees under that patent, the limited company called the J. P. Bemberg Cotton Industry Association, of Vehde, near Barmen-Ritterhausen, declared that the proper object of that invention is the mercerizing and dyeing of wefts in one piece, i. e., vegetable and animal filaments, in order to produce double-colored effects, in contradistinction to the already known process of mercerizing and dyeing, in which the vegetable filaments must, before dyeing, be mercerized in a stretched condition. The German Patent Office, however, assumed that the essence of the process consisted in the stretched condition of the filament during the whole time of mercerizing, which condition was described in Lowe's specification in such a manner that it could be produced by any competent man. This decision opens up a wearisome prospect of disputes and possibly litigation.

The Thomas & Prevost patent rights in this country and Canada are owned by the American Mercerized Cotton Yarn Co., an offshoot of the American Thread Co., that was organized a few months ago under New Jersey laws. This company has not yet been organized and the amount of its capital stock has not been made public. It is reported to have paid $750,000 for the Thomas & Prevost patents, and to have expended fully $100,000 in legal fees in proving the scope of these patents and in convincing mercerizers that they would be obliged to pay them royalty.

They made the claim that their patents controlled all processes of mercerizing yarns, and are said to have warned all mercerizers who had not recognized their rights that legal steps would be taken to oblige them to pay royalties.

Fall River, July 17.—The persons in authority in the American Mercerizing Co. are of opinion that the German Patent Office decision affecting the validity of certain mercerizing patents do not affect the patents in which the American Mercerizing Co. have rights.

While in England recently some of the authorities had the matter called to their attention and it was investigated at that time. It was defined by them that if certain conditions obtained here in the handling of the product the patents might be infringed, but as the American company does not operate under the conditions mentioned and does not want to, it cannot be affected by any decision that might be reached in the cases then pending which presumably has been reached.

Paris Exposition.

THE UNITED STATES NATIONAL PAVILION.

The United States National Pavilion is situated on Quay d'Orsay on the left bank of the Seine among the buildings of the great powers. Its site is one of the best locations at the Exposition.

The plan is square with a large central dome and rotunda which will be used as a general meeting place of Americans during the Exposition. Three sides of the rotunda have rooms 13 by 36 opening out of it. That on the left of the main entrance will be used as a lounging room for gentlemen; that on the right for ladies and that in the middle as a parlor for both ladies and gentlemen. The second story will be given to the States where people who so desire can rest and register their names. The third story will be reserved for the private offices of the Commissioner General and Staff. The fourth floor will be given to the States and used in a similar manner to the second.

The building is eighty-five by ninety feet and one hundred and sixty feet high from the lower level. There will be two electric American elevators.

The style of the exterior of the building is classic, and while different in design from any of the buildings at the Chicago Fair, yet the feeling there prevalent has been kept and will be in marked contrast to the present buildings, which are not so architectural in treatment.

The main entrance is under a large portico which spans the esplanade, and under this, every visitor who walks to the other national buildings, will be obliged to pass. In the centre arch of this portico, facing the River Seine will be French's statue of Washington, while a bust of President McKinley will occupy a niche over the door. In the front of the building on the river bank will be a boat landing which will be highly ornamented as a classic barge. All the boats of the American line which connect with the American trolley system at Vincennes will make a landing at this pier. It is the intention of the art commission to employ the best American mural painters upon the interior work and make it the finest example of decorative art which the United States has thus far produced in any exposition.

The Commissioner General has appropriated ten thousand dollars as a nucleus of a fund for this purpose, and it is hoped there will be enough patriotic citizens sufficiently interested in the development of mural decoration to aid in raising such a fund as will enable the United States to be properly represented in this branch of the fine arts.

—During the last two years a considerable portion of wool coming from La Plata has been defective, partly from want of care on the part of the growers, and partly from ill-advised experiments in cross-breeding.

Reforms in the Cotton Trade.

TARE ON AMERICAN COTTON — WEIGHING — OLD AND NEW SYSTEM OF BALING.

There have been some misstatements in both American and English newspapers as to the adoption of new rules by the Liverpool Cotton Association. For a long time, there has been an agitation on the part of the association for a revision of the rules of the trade in the Lancashire district, many of the old rules being thought out of date and considered to interfere with the easy and natural course of trade, particularly with the United States, which produces most of the cotton handled here. It has, however, been found impossible for agreement to be reached on most of the points favored by the Liverpool Cotton Association, there being much opposition among the Manchester cotton men, and particularly on the part of the spinners of Lancashire. After a number of conferences and long consideration, the Liverpool association has decided to make only one of the proposed revisions obligatory — and that is a requirement that the weighing and invoicing of cotton shall be in pounds, instead of hundredweights, quarters, and pounds, as at present. This new rule is to go into effect on October 1. The association has also agreed to recognize the following optional rules: (1) That the allowance for tare on American cotton shall be 4 pounds per hundred pounds, instead of 112 pounds, and that the allowance for "double draft" be abolished; (2) that the allowance of 1½ per cent. in invoices be abolished.

United States Consul James Boyle, Liverpool, writes to the State Department, Washington, that the prospect is that with the first arrivals of the new season's crop in October, there will commence an active competition in this market between the new and old systems of baling. Up to within the last few months there was but small interest taken here in the new systems of baling, although the present system is universally condemned as being wasteful and antiquated. The cotton men of Liverpool, while expressing disgust at the present system, have not felt called upon to take any active steps in the direction of reform. They are all on an equal footing, and by insurance and by the customs of the trade they protect themselves against financial loss arising from the present defective and wasteful system of baling. Indeed, middlemen actually make a profit out of the imperfections and wastes of the present system. Of course, somebody ultimately has to pay for these gains made by those who handle the cotton here as intermediaries. The bulk of the loss caused by the present system undoubtedly falls in the end on the original producers of the cotton in America, and most of the remainder of the final loss falls on the spinners.

During the past two years, there have been a number of different systems for the baling of cotton presented before the Liverpool trade, all of them being of American invention. Eighteen months ago the cylindrical "lap" bale, introduced by the American Cotton Company, attracted some attention here. A few small shipments were made, but no more was heard of the bale in this market. One sample of the "Churchill" square bale was sent here about six months ago. This bale is of greater density than the ordinary square bale and is held together by wire instead of steel bands. It was highly commended here and was thought to be equal to the Egyptian system of baling, but no more has been heard of the Churchill bale. Since then, information has come of another square bale, manufactured by the American Cotton-Bale Company, of Providence, R. I. By this system the cotton is tightly compressed and is encased by thin steel sheets, fastened together by metallic strips. There is great curiosity as to this bale. It is conceded that the cotton will be preserved in excellent condition, but the seeming difficulty

of sampling is urged against the bale. It is said that shipments under this system will be made at the commencement of the next cotton season.

The most thorough and energetic attempts that have yet been made to introduce into the Liverpool market an improved system of baling is that now being made by the Planters' Compress Company, owners of the "Lowry" system of cylindrical baling.

A number of dealers have expressed their intention of handling the Lowry bale next season, it being understood that arrangements have been made for fully meeting the expected demand. Whether the Lowry bale is a solution of the problem, and whether it is destined to supplant the present system, are questions which the opinion of the trade here, with characteristic conservatism, is not yet prepared to answer; but it is altogether likely that there will be, with the incoming of the new crop, an improvement in the baling of American cotton.

Tax on Cotton Gins.

The Texas legislators are not doing themselves any credit, in advancing the industries of their State, by the passage of, or even proposing, such vicious laws as have been discussed of late years, touching pursuits of industry that have entered their State. A bill has been introduced of late, known as the Cole's bill, providing for the imposition of a tax equal to forty per cent. of the gross earnings, upon cotton gins, known as round bale gins. The bill was intended as a direct attack upon the methods of the American Cotton Company, but it affects all similar methods, and has a more or less wide application. Texans must learn.

Over-Time Work a Nuisance.

It appears that the Supreme Court of Rhode Island has been asked to prevent the running after dark of a woolen mill in Olneyville, Providence, because of the noise that the machinery makes, disturbing those in the neighborhood. It seems that this mill is rushed with orders, and has to operate its machinery over time, in order to meet the demands for its special grade of goods. The injunction asked for against the mill is because of the noise disturbing the comfort of the people about it, and making the tenements undesirable, causing the landlords to lose their tenants. The plea of the complainants is that, while they are not socialists, they do not believe that any man should be allowed to acquire wealth at the expense and discomfort of other men. Every person had a right to comfort and peace at night.

English Textile Shops Combine.

There has been a report circulated in the press of this country concerning recent projects for combining the English textile machine shops in and about Manchester. If such a movement has been inaugurated, or thought of, it is not known by the representatives of the English shops in this country. It is alleged, however, that this scheme has been considered for some time past, and is likely to go through. We make this statement for what it is worth. The shops whose names have been connected with this combination are as follows: Howard & Bullough; Platt Brothers & Company; Asa Lees & Company; and Dobson & Barlow.

—"Bradstreet's" index figures show the low water mark in prices to have been 56.803 October 1, 1896. On July 1, 1897, they were 66.937, but between these dates they had been over 88; they reached 76.556 on August 1, 1898. 77.819 on January 1, 1899, and 80.818 on July 1. This is almost exactly the same as on July 1, 1892, 80.629; but on July 1, 1891, the figures were 91.633 and on October 1, 1890, 105.996. The most rapid part of the fall, however, occurred in the next two months; the figures for January 1, 1891, were 94.236. During June thirty-six articles on the list of "Bradstreet's" advanced,

fourteen declined and fifty-five remained unchanged. In twelve months sixty-three advanced, twenty-six declined and fourteen remained without change.

—It appears that the city of Lawrence, Mass., receives some benefit from the sale of the Washington Mills to the American Woolen Company. The former is now regarded as part of a foreign corporation, so far as the city is concerned. This fact enables the city to assess the stock of the company, which makes the assessors' report for the past year show an increase in valuation of $1,072,314, due chiefly to the above change in ownership. The tax for 1899 for the city is, therefore, reduced to $15.60 on $1000.

New Textile Fabric.

A new figured cloth has recently been invented by a citizen of Glasgow, Scotland, which we herewith illustrate, with the idea that it may interest many of our readers and designers. For a ground, any weave suitable to form the texture desired, may be made, such as a plain cloth or a gauze cloth or a combination of plain and gauze cloth. This ground cloth is woven in stripes, each consisting of one thread or two or more threads, as desired, there being an open space between each stripe. In each of these open spaces a thread is worked, called the "binding-thread," and in conjunction therewith and corresponding to each binding-thread is worked another thread which is the figuring-thread, and called the "whip-thread." In the process of weaving the whip-threads are raised one pick on the right-hand side of the binding-threads and then one pick on the left-hand side of the adjoining binding-thread situated to the left, and so on alternately at each pick. This is done simultaneously with the formation of the ground-shed, so that when the shuttle is thrown it passes and carries the weft underneath the whip-threads. In the parts where figuring is to be produced the binding-threads are held down or allowed to remain down during the passage of the shuttle, and in the parts where no figuring is required the binding-threads are raised along with the whip-threads during the passage of the shuttle. Thus where the binding-threads remain down the shuttle and weft pass over the binding-threads and under the whip-threads, and as on the following pick the whip-threads are raised on the opposite side of the adjoining binding-threads the whip-threads are stretched from one binding-thread to the adjoining binding-thread. Where the binding-threads are raised along with the whip-threads, the shuttle and weft pass under both the binding and whip-threads, which permits the whip-threads to be drawn back to the ground-stripes. Where this is done, the whip-threads form part of the ground-stripes and no figure is formed excepting such figure as may constitute the ground-weave. It will thus be seen that by manipulating the binding-threads any variety of figure may be formed.

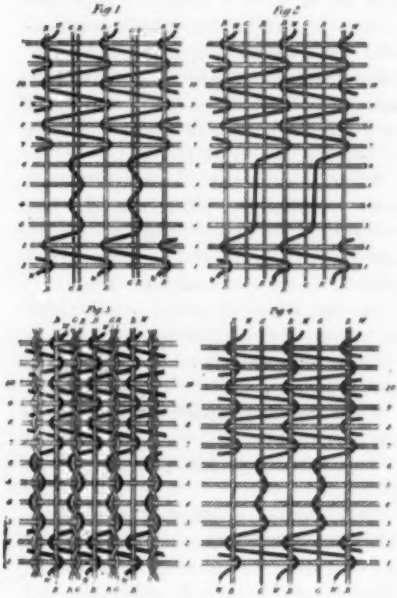
In order that this fabric may be better understood, reference to the accompanying diagrams may be made.

Figures 1, 2, 3, and 4 show different embodiments of the invention.

In the figures the binding-threads are marked B, the whip-threads W, and the ground warp-threads G and R. The weft-threads or picks are marked 1 to 10.

Fig. 1 is an example of a figured fabric with a plain ground. The weft-threads 1, 2, 7, 8, 9, and 10 illustrate parts at which figuring is effected, and the weft-threads 3, 4, 5, and 6 illustrate parts at which no figuring is effected. The ground warp-threads G and R can be raised and lowered by healds or harness alternately in the usual way at each successive pick, so as to form the plain ground-weave. The binding-threads B can be manipulated independently by healds or by harness. The whip-threads W can be manipulated by needles fixed in a frame

or in frames which rise and fall in front of the beating-up reed. For the weft-picks 1, 3, 5, 7, and 9 the said threads are raised by the needles on the right-hand side of the binding-threads B, and for the weft-picks 2, 4, 6, 8, and 10 the said threads are raised by the needles on the left-hand side of the adjoining binding-threads situated to the left. When it is desired to form figuring, the binding-threads B are held down so that the weft-threads



pass over them and between them and the whip or figuring-threads, so that the whip-threads W are caught by the weft-threads 1, 2, 7, 8, 9, and 10 and held in the position occupied by the binding-threads B. If for the previous pick the binding-threads B have been raised, then the whip-threads W will be stretched from the left-hand side of the ground-threads G to the right-hand side of the binding-threads B, as is shown between the picks 6 and 7, or they will be stretched from the right-hand side of the ground-threads R to the left-hand side of the binding-threads B, as shown between the picks 2 and 3; but if for the previous pick the binding-threads B have been held down the whip-threads W will be stretched from the left-hand side of the binding-threads B to the right-hand side of the adjoining binding-threads B, as is shown between the picks 1 and 2 or 7, 8, 9, and 10. When it is desired to form no figuring, the binding-threads B are raised so that the weft-threads pass under both the binding-threads B and the whip-threads W, so that the whip-threads W are not caught by the weft and the binding-threads B, and the whip-threads W under the tension with which they are woven are drawn back to the ground-threads G or R. If for the previous pick the binding-threads B have been held down, the whip-threads W will be stretched from the binding-threads B to the ground-threads G or R, as before mentioned; but if for the previous pick the binding-threads B have been raised the whip-threads W will be turned around the ground-threads G or R, as is shown between the picks 3, 4, 5, and 6. It will thus be seen that by manipulating the binding-threads B figuring or absence of figuring may be formed at will and so the requisite design be produced.

The binding-threads can be manipulated in accordance with the design required by any suitable or known method—such as jacquards, dobbies, or the like—as will be apparent to weavers without further explanation.

In designs where there are long stretches without figuring the binding-threads B, being lifted every pick, would float upon the surface of the cloth too long to make a satisfactory fabric. This may be obviated by making a single shot of figuring at fixed intervals and so bind these threads to the body of the cloth.

Fig. 2 is another example of a plain ground wherein the plain sheds are reversed from Fig. 1, so that when the needles carrying the whip-threads rise on the right-hand side of the binding-threads B the ground-threads R, situated to the left, are raised instead of being held down, as in Fig. 1, and

when the said needles rise on the left-hand side of the binding-threads B the ground-threads G, situated to the right, are raised instead of being held down, as in Fig 1. The effect of this is that when no figuring is being made the whip-threads W are drawn by the tension back to the ground-thread (G or R) situated farthest from the binding-threads B operated upon and the whip-threads W float upon the surface (see picks 3, 4, 5, and 6) instead of being twined around the ground-threads G and R, as in Fig. 1.

Fig. 3 is an example of a gauze ground, the ground-threads G and R being twined around one another instead of being worked plain, as in Figs. 1 and 2.

Fig. 4 is an example of a cloth in which one thread constitutes the ground-stripe. The binding-threads B and the whip-threads W are manipulated as in the other illustration; but the ground-threads G are held down continuously, so that where figuring is being formed the ground-threads G lie between the weft-threads and the whip-threads, as shown in picks 1, 2, 7, 8, 9, and 10, and where no figuring is being formed the whip-threads W twine around the ground-threads G, as shown in picks 3, 4, 5, and 6.

The Angora Goat's Hair.

TIFTIK OR MOHAIR.

The tiftik (mohair) is, as it is known, the hair of a breed of goats special to the countries of Angora and Castamouni. It is reported that this kind of goats has been introduced in these provinces by Armenians that emigrated from Van, but under the favorable climatic influences of Angora, the breed was modified and much improved. Today, however, the Enguru tiftik is infinitely superior to the Van tiftik. The tiftik has been, since 75 years, the chief commercial article of Angora. It has made the prosperity of the country, and has later been the cause of its decline.

Formerly the tiftik was not exported raw, but worked in the country itself, and used for the making of clothes and yarns. These articles were exported to Europe, the manufacturers being all Armenians, possessing important secrets as to the color and its brilliancy. They never admitted foreigners in their spinning works and today the best spinners in Angora are still Armenians.

In 1812, the trade of clothes made of tiftik was very fully developed, large quantities going to Smyrna, which was for it, at that time, the principal shipping port on the Mediterranean, and used as an emporium by European traders. There they had their agents and correspondents, and from this port such kind of goods was sent to Europe, chiefly to Holland.

In 1821, large lots of tiftik had been sent to Smyrna, when the Grecian revolution occurred, and in consequence a commercial crisis, which ruined many merchants of Angora.

At that time the prices of the tiftik in yarns were as follows:

Yarn for local use: 7 to 12 Piastres the 40 Drams.

Yarn for local export: 4 to 7 Piastres the 40 Drams.

Raw Tiftik: 5 to 10 Piastres the Ocque.

The annual production was from 300,000 to 350,000 ocques, one-third of it being used for the making of woven fabrics and two-thirds were exported in yarn.

It was only towards 1830 that the tiftik began to be exported in the raw state. Till that time a severe law forbade, under penalty of death, the export of it. From 1834 the exportation of tiftik goods and yarns was almost nil, to the great detriment of the Christian population of Angora, which lived upon that industry. In fact, about 350,000 ocques of tiftik were sent abroad in the raw state instead of being worked in the country of its production. The raw tiftik had reached the price of 22 piastres per ocque. Prices advanced with an increasing production which amounted to 1,000,000 ocques in 1836. In 1837,

however, the prices fell very low or to 3 to 4 piastres per ocque, in consequence of the political crisis in the United States, which imported large quantities of this material. This depression lasted till 1840, when the tiftik gradually went up from 3 to 4 piastres per ocque, and even to 22 piastres, but it did not remain there for a long time. The political events of France at that time were the cause of a considerable fall in the price. From 1848 to 1855, the Angora tiftiks advanced gradually from 7 to 12, 22, 23, 26 and even 27 piastres per ocque.

From that era, this trade extended immensely and if momentarily there was some fall in prices, it was followed immediately by considerable advances. From 1862 to 1863 the tiftiks cost 28 to 30 piastres per ocque, from 1863 to 1866 it reached 40 to 41. But again the war between Prussia and Austria had a disastrous consequence, the tiftiks falling to 17 and 18 piastres. This crisis did not last long, scarcely three months.

It is from 1867 to 1870 that this trade reached its highest pitch in Angora. The annual production was pushed to 2,000,000 ocques and the fabulous prices were reached of 40, 50 and 52 piastres per ocque. Prices underwent a decline during the Franco-Prussian war to 36 piastres per ocque, but did not remain there a long time, and went up soon to 50 and 52 piastres again, till 1874.

The industry and trade of tiftik had been, till 1874, a source of fortune and prosperity for the country of Angora. Everybody was well at ease, several merchants having made fortunes, amounting in some instances to $2,000,000, but towards 1874 the decay began, and was soon followed by the ruin of the formerly richest firms.

Here are summarily the chief causes of this decline: First, the government by a great mistake, authorized the exportation of the tiftik goats and that mistake killed the most productive commercial article of several provinces—Angora, Castamouni, Koniah and even Brousse. Important exportations of tiftik goats, or mohair goats, pure breed of Angora, were made to the Cape of Good Hope, so that this last country produced yearly since 1865, from 40 to 50,000 bales of tiftik, or 7½ to 8 million pounds. The production of merino wool came in disastrous competition and was also the cause of falling prices for tiftik. It lasted 20 years, from 1875 until 1894 when the value was only 9, 10 and 12 piastres per ocque, causing the ruin of the country of Angora, formerly so rich.

Lately there has been an improvement in the transactions in tiftik. In 1895 from 17 to 18 piastres, prices of last year, went up to 21, 22, 26, 28 and even 30 piastres and more.

This advance is reviving the hope of the ruined merchants of Angora and is attributed to large sendings of the material to the United States.

The Turkish Government perceived too late its fault and the mistake formerly committed, and has again forbidden the export of tiftik or mohair goats.—Bulletin des Laines.

The First Jute Manufactory of Mexico.

The remarkable industrial transformation of Mexico, which has been accomplished under the enlightened and energetic administration of President Porfirio Diaz, is strikingly illustrated by the rise and development of jute manufacture in that country. Under the provisions of a very liberal general law, that carefully guards the rights of the public as well as those of corporations, the Mexican Government entered, on the 3d of December, 1892, into a contract with T. F. E. Kinell, who was authorized to establish, within five years, four jute factories, in localities to be selected by the Government. Work upon the first factory was to begin nine months from the promulgation of the contract, and to be completed in three years. A capital of $200,000 (Mexican) was required, $10,000 of this to be invested in bonds of the national consolidated debt. A liberal provision was also made to admit temporarily free of duty all ma-

chinery and raw materials necessary for the successful starting of jute manufacture. In addition, a ten years' exemption from all federal imposts, except the stamp tax, was granted.

The results ensuing from this contract were most gratifying. Two years from the time of promulgation, and one year before the date stipulated, the first establishment for the manufacture of jute in Mexico, and the first in the world to be operated by electricity, was inaugurated. Stimulated by the privileges conceded to the contractor, Mr. Kinell, a company was easily organized in London. A capital of $487,000 was subscribed, but since increased to $730,000. This company, to whom, by permission of the Mexican government, Mr. Kinell transferred his contract, now owns and operates the factory. This is situated at Congregacion de Barrio Nuevo, one mile from the city of Orizaba. The power is furnished by means of electricity obtained from the Cascade of Barrio Nuevo, which, falling from a height of 117 feet, can supply 12,000 horse power in the rainy season, a complete and expensive power house having been erected. In the factory, there are more than 600 operatives, and the company intends soon to increase the number to 1000. The machinery of the factory is very complete, with the latest modern improvements; besides the power apparatus at the Cascade of Barrio Nuevo, it includes 70 motors, two of them of 150 horse-power, and a perfect system of electric lighting; the number of looms was in July, 1895, eighty-five, and is now one hundred and twenty, the rest of the machinery having increased in proportion. As a result of this increase, the daily output, which, in 1895, was four or five tons, is now eight, and will soon reach ten.

The finished products are chiefly floor carpets, sacks for cereals, packing cloth, and similar articles. These products are in much demand, and compete successfully with the best goods of the same class imported into Mexico. The management of the factory takes an active interest not only in the sustenance and material welfare of its operatives, but also in their education, hygiene and morality. They have succeeded in closing several unsanitary establishments near the factory, and have provided departments of recreation and physical exercise for their operatives.

To sum up: by means of concessions, the burden of which has not been felt by the Mexican treasury, nor by the company, nor by the consumer, a new and lucrative industry has been established in that republic, namely, a factory whose plant exceeds one million Mexican dollars ($500,000); an industry that supplies the domestic market with articles of excellent quality, and at a lower price than could be formerly obtained. A considerable investment of foreign capital has been encouraged, and steady employment, at good wages, assured to 600 Mexican operatives.

Electric Looms.

An Austrian has recently taken out letters-patent in this country for a circular loom, with electro-magnetic shuttle driving arrangement. This method of adapting electricity to the propulsion of the loom shuttle is apparently occupying the attention of inventors to a considerable degree, and several patents have been issued upon this line. The shuttle invention in question is outside of all mechanical parts, and the latter are driven by a single vertical shaft in the centre.

A New Card Grinder.

The Hardy Machine Co., of Biddeford, has always made a good card grinder, but to keep abreast with the constant development of textile machinery, has brought out its 1899 pattern traverse grinder, which embodies not only their own years of experience in building this class of machinery, but the suggestions from competent mill men based upon the practical use in the mill. Simplicity and effi-

ciency have been aimed at, and they believe that in these two points and in the quality of the workmanship, it is unexcelled.

This grinder is driven with one band and a differential motion, necessitating the least number of working parts and giving reliability of motion and freedom from wear. The friction clutch which is used on their pulleys and differential motion eliminates the use of set screws, which not only bruise the journals, but prove inconvenient in many respects.

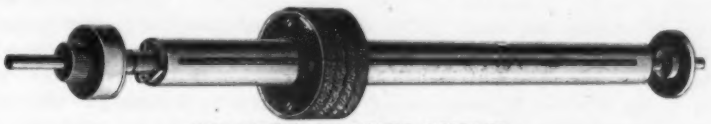
Another improvement is in the bushing on the motion end of the grinder. Instead of being detachable, it is made in connection with the casing of the motion. On the elongated part, between the motion and the end of the grinder, there is an adjustable spurred brass clamp, which can be fastened at any point to correspond with the holes in the grinding stands.

By making a few alterations, their new pattern differential motion can be applied to any traverse grinder used in cotton mills, making an up-to-date machine.

There are a number of minor improvements, all of which tend to improve the grinder, such, for instance, as the change in cutting the screw so that when the emery wheel changes at either end, there is no jar. All journals are hardened.

This 1899 pattern grinder has been thoroughly tested not only on new work, on which a number of them are running in the shops of card builders, but on regular work and on waste and batting cards, which have to be stripped every 90 minutes, and we understand have given perfect satisfaction and after months of such service run as easily as when first put to work.

The improved features in this grinder are covered by letters patent, which have recently been issued.



THE NEW HARDY CARD GRINDER.

French Rearing Houses for Silk Worms.

When the eggs of the silk moth, of which there are generally from 30,000 to 40,000 to the ounce of grains, are hatched, the caterpillars are covered with small branches of the mulberry tree, and in a very short time, stimulated by hunger, they climb on the leaves, and are then removed to the rearing house or magnanerie, a closed room where the worms are sheltered from the wind and cold. This room is filled with shelves, about a foot apart, made of wickerwork. The object of these shelves is to furnish a large surface to the insects, where they can move about freely, eat, breathe, and moult.

It would be impossible to describe the different styles of rearing houses used in France. It will suffice to say that the essential point kept in view is free ventilation, so that the worms can be provided with the necessary amount of oxygen for respiration and that the carbonic acid, derived from the exhalation of the insects and the decay of the mulberry leaves, can have free exit. The ventilation is considered sufficient when the person who attends to the rearing house breathes without effort and perceives no bad odor. In good rearing houses, the walls and ceilings are whitewashed, and the shelves, as well as all the woodwork, are submitted to sulphur fumes a few days before the worms are brought in, while a hygrometer and a thermometer, the one to warn the attendant of any humidity, which would be fatal to the silkworm, and the other to indicate the degree of temperature necessary for its proper development, are parts of the equipment.

COTTON DEPARTMENT.

Leno Jacquard Designs.

In our last article was explained the method of drawing in the threads through the harness to weave an ordinary gauze pattern with two threads crossing two, and the care that was required in order to have the threads right so that the pattern would be perfect, and also that no undue strain, wear and tear should be put on the doups or threads. If threads are drawn in wrong, we are bound to have as a result bad weaving and a poorly woven piece of goods. This is of great importance, as in an ordinary brocade jacquard, if the threads were drawn in wrong, we would have a badly woven cloth, which would make it become a second. But in a leno such wrong drafts will raise the expense considerably by the undue wearing of the doups, as explained in our last. Not only this, but the fact that the threads not being drawn in straight, but having to pass through doups, will cause a considerable loss to the weaver and also to the manufacturer, as the loom will be stopped when it ought to be going.

We often hear the saying, "For production keep the belt on the tight pulley." The first thing that is required is to see that all threads are right and motions set as they ought to be, then and only then, by having the belt on the tight pulley, will we have production, combined with quality, for production of itself without quality is simply nothing more nor less than a loss to the manufacturer; therefore the saying is perfectly right as regards production if we combine with it quality.

To proceed with the leno jacquard design. The illustration given at Fig. 1 is somewhat similar to the one given in an article (November, 1898, page 59) some time back as a suggestion for a design. It is here reproduced so that the designing of such can be illustrated. In the first place, it is necessary to know the number of harness required to make the pattern; therefore in the example given we will occupy three rows each for the fancy cord stripe and thirteen rows each for the gauze stripe, so that the full number required will be 32 rows or 256 harnesses to one full repeat of the pattern. We will take, first, the gauze stripe and leave the fancy cord stripe for last. As the full design will be too large, a small part of such, a leaf, will be made which will serve to show the principle. The figure is to be made plain and the ground gauze. It will probably be at once noticed that while the figure seems to have a resemblance to a leaf, yet the curves seem to be a little out of shape. This cannot be avoided, as take, for instance, a leaf designed for an ordinary brocade jacquard, we find that it is somewhat different from the original sketch, although not to the same extent as the one here given, as will be explained later.

This system of designing is for the machines that are tied up on the American principle. The pattern given occupies eight large checks or sixty four small ones. Now as gauze is formed by raising the doup standard for one, two or more picks, and then immediately the crossing threads raised for one, two or more picks, we can readily see that something must be done to effect this. In this design the threads work in fours, two threads crossing two. As already explained, the two back threads of the four pass through the doup, and the threads through the first and second over the doup, so that, having raised the doup for three picks, we shall have raised the back two harnesses, and left the doup standard harness

and the first and second harness down. To make the gauze the doup standard and the easer harness are raised, and all four figuring harnesses left down, which will consequently bring the two threads on the opposite side from the preceding picks.

Now note the design, Fig. 2. The first 16 checks are for raising the doup standards. In order that the right checks will meet the right needles in the jacquard, this design will have to be up-ended, or the bottom put to the top. Now take the first pick, and passing the first doup we will take the second. We find that the seventh and eighth threads are raised. These will raise the doup as working in fours, the back two of each going through the doup, leaving down the fifth and sixth harnesses. This is repeated for three picks. Then on the fourth pick we find that all four harnesses are down, but as we have to make gauze and bring the threads over to the other side, the doup standard has to be raised. This has been done, as will be seen by referring to the second line past the figure, and the same is repeated for three picks; and so on in this manner is gauze formed for the ground in all the fabric. If the figure had to be constructed of gauze and the ground plain, the proceeding would be just the same to form the gauze.

When transferring the figure on the design paper, the sketch is made as for an ordinary pattern, and then round the edge the figure will be made according to the number of threads working together. In this case there are four, so that in working along the edge of the sketch the figure has to move in steps of four, warp ways, and this will account for what seems to be the deviation from the original sketch. Although this is the case, we are not compelled to move in steps of four, filling ways, as by not adhering to this we can get a better result, although, to accomplish this, the gauze round the figure will have to be broken to a certain extent. If we were to fill in our figure just on the line sketched, we could not obtain so good an effect, as some of the threads of the four would not be raised, and even in this instance if we were to raise the doup standard the threads would cross each other.

It is generally understood that, whenever possible, the doup standard should rise immediately both before and after the figure. On examination, it will be seen how this is accomplished, and at the same time prevents the breaking up of the gauze to any great extent. In filling in the ground round the figure, extreme care must be taken, otherwise there is a liability that the gauze, when it comes to be connected, will not join

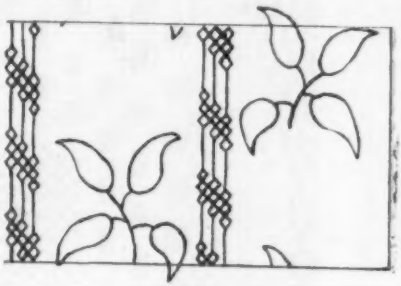


FIG 1.

correctly, but may be a pick or so wrong. If the gauze was made with four picks in each crossing, then we could see at once whether they would be right or not, but when only three picks are used we have to calculate or work out some part around the figure that is not connected with it. Then we can get the right joining, or we may take a line of design we are making, then, as the gauze repeats on six picks, to join correctly on the other side of the figure, a measure of the number must be taken, and the first pick of the six begun on the next pick of the measure. For instance, the figure at one part occupies, say, 40 picks, then 6 times 8=48, which would be, if no figure, eight repeats of the pattern, so the next pick will connect on the 49th.

We will now proceed with the fancy cord stripe. The question as to the manner of drawing in the threads

through the harness for a stripe of this description, requires quite a little thought as there are various points to be taken into consideration, such as getting the right number of harnesses and in their proper order, then making the design to correspond with the drawing in plan. This is very important, for if the threads are drawn through a certain harness, that is, the figuring cords, and the design is not made to correspond, we should not produce anything like the pattern desired. Then again, if the number of threads in a stripe of this description is not sufficient to occupy the whole rows of harnesses then something must be done so that the whole may be occupied, or they must be cast out in such a manner that the weaver will know at once which is the right harness to use.

Take for example the pattern given. We know that three rows are to be occupied by this stripe, so that will give one row for one cord pattern. We desire to have two double threads crossing each cord, so that this will occupy six harnesses out of the eight. We could cast out the third and fifth, or the fourth and sixth; but whenever a case like this occurs with a cord stripe it is advisable that the cord be taken through two harnesses and there be no cast out.

In drawing in the threads we must always remember that whatever threads pass through the doups, those threads have first to pass through the easer harness at the back. If this was not done it would soon be noticed in weaving, especially if a cord, as when crossing it would have a tendency to break the threads.

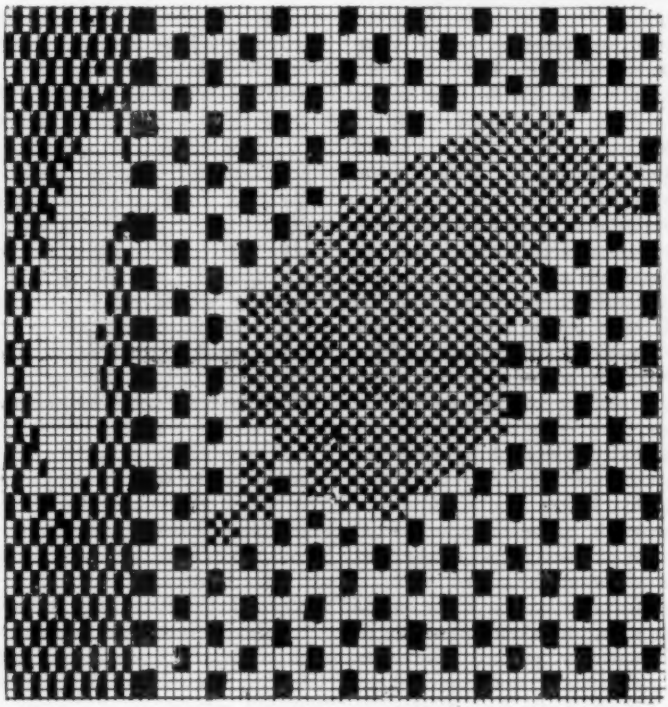


FIG. 2.

The full drafting plan will then be as follows: Two double threads, to pass between easer harness, and one double thread, each, through 1st

and 2d figuring harness, and first cord through easer harness and through 3d and 4th figuring harness, and through doup; then second cord through easer harness and through 5th and 6th figuring harnesses, and through doup.

Two double threads to pass between easer harness, and one double thread each through 7th and 8th figuring harness. This to be repeated three times. Then the threads for the gauze stripe as usual, and the whole repeated. It will, therefore, be observed that in drawing in the cords a right and left hand doup will be required.

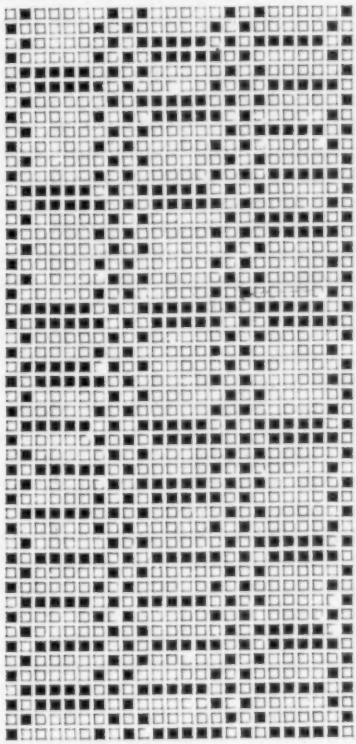


FIG. 3.

Having drawn in the threads, or decided on the manner they have to be we can then proceed to make the design for such. This is illustrated at Fig. 3. The first six checks are for the easer or standard harness, as, if used for easer, the same will only need repeating for the doup standard harness, and the next twenty-four checks are for the cord which equal three rows of harness.

Whenever two patterns or weaves are combined in one design, that design must be made so that each pattern will repeat itself at the end, so as not to have any broken effect. Therefore, if the cord stripe repeats on 50 picks, we can make the design for the gauze on, say, 250 picks, which will give an even number of repeats. The diamond portion of the pattern repeats on twenty-four picks, and the plain portion on twenty-six picks, which gives fifty picks to the pattern.

On examination of the design, Fig. 3, it will be noticed that those threads which cross the doups weave plain all the way through. Generally a leno, when making a doup or crossing pick, the threads, which pass over the doup, are left down, but in this case if made in this manner the filling would lie rather loose on those picks at the back of the cloth, so that by being bound in, it makes a firmer cloth.

Examine the design: For the first two picks the doup standard is raised, then the cord is left down for two picks. The third and fourth harnesses are then raised which brings the cord to the other side. The cord is then left down for two more picks, and this is repeated three times to form the diamonds. For the next twenty-six picks it is made so that the cord will show more on the face of the cloth. Each of these cords weaves the same towards the centre, but have to be slightly altered at the beginning and end, because there are twenty-six picks in the straight portion and only twenty-four in the diamond. On examination it will be seen how this is accomplished. Having shown one stripe, the next one is simply a repetition of the first, only that where the cords are weaving straight in the first, the diamond effect will be weaving in the second.

THOMAS.

Principles of Cotton Spinning.

ROBERT CUNLEFFE.

In our last article we referred to the necessity for the draw frame to equalize the sliver from the card, in addition to that of paralleling the fibres.

Years ago, very serious complaints were made respecting irregularities in mule yarn, when, if the mule had been put to spin say 32s twist, one cop might wrap 26s, another 36s or 40s, and another about right: it was thought by putting two together, the 26s and 36s, and drawing them out to their proper dimensions, the right counts would be produced. So, doubling and drawing were commenced. Then the doublings were increased to 3, then 4, then 6, and in some cases at the present time 8 are doubled into one, with a corresponding amount of drawing, and that not just doubling 6 into 1, but a repetition of that by three or four times as the case may be. The rule for very short stapled cotton and low counts is to have two heads or boxes of draw frames, and for medium counts three heads, and for fine counts and long staple four heads.

In the medium counts we should have $6 \times 6 \times 6 = 216$ doublings at the draw frame, and with two doublings at the intermediate frame, two at jack, and two at mule, we bring the number of doublings for medium counts carded yarn up to 1728.

For fine counts of combed yarn, it is very much greater than this, but we leave that for the present.

This increased doubling and drawing is undoubtedly a very good thing, the greater the number of doublings the greater the chances are that the heavy and light slivers will combine with those more nearly right, and the combination will be to the advantage of the resultant yarn. Of course, we cannot close our eyes to the fact that in the doubling together of these irregular slivers, two heavy, or two light slivers might at times be going up together, which would make matters worse; but experience has proved that the greater number of doublings, the greater regularity will be the ultimate result. It will be quite obvious to all, that the doubling together of six or more slivers, will, under ordinary circumstances, entail a great amount of care and labor upon the attendant, to prevent this amount of doubling increasing instead of lessening the irregularities in the resultant sliver.

With the draw frames running as they did for some years, after the doublings were increased without any means of stopping the frame, a sliver would very often break, and the frame continue running for some time before the attention of the attendant or tenter, as the person in charge of these frames is called, was directed to it. Then a very great amount of waste was made, if the whole length had to be taken out, which had been running with five ends instead of six; or, if the end was pieced up and allowed to run on with the light sliver at the front, the yarn made from that length would be one-sixth lighter or finer than the rest.

I think it will be interesting to our readers to carry this idea out a little farther. Suppose only ten yards of sliver were allowed to pass on when one end out of the six had been down in the first head. Then in the next head there would be 60 yards, and in the third head 360 yards; on the slubber bobbins 1440 yards, on the intermediate bobbin 7200, on the jack bobbin 43,200 yards, and at the mule 432,000 yards of yarn, or 514 full hanks. And if the mule was spinning 40s, these 514 hanks would be about 46½. Thus we shall see that by increasing the number of doublings at the draw frame, in order to prevent irregularities in the yarn, a greater danger was made of increasing those irregularities, or of making considerably more waste than had previously been the case. And thus it soon became obvious that some means must be adopted by which, if any one of the ends or

slivers should break, or any of the cans run empty, the frame shall immediately be stopped. This will show us the importance of the different stop motions which are now applied to all draw frames.

There are three stop motions put to all draw frames. The front stop motion is to stop the machine before the broken sliver shall have reached the back roller, and to enable the piecing to be made before the end is lost. Then there is the front stop motion, to prevent a great amount of waste being made or roller laps forming on the front roller. Then there is the can stop motion, which will stop the frame when the cans are full, or when a certain length of sliver has been passed into the can.

It is found very advantageous to put the same length of cotton sliver in each can, so that when they are all placed up to the next passage of drawing, or up to the slubber, they will all be emptied at about the same time. By this means the attendant, or tenter, knows which cans require replacing, without looking into more than one. When the quantity in the cans vary, the tenter is compelled to look very well after them, otherwise the machine will stop very often. Another objection to the old system was the liability of the cans being filled till no more could be forced into them, thus damaging the sliver and often breaking the coiler top. By using the can stop motion the work of the tenter is now systematic, and a greater weight is got through the drawing frame.

At one end of the frame there is an eccentric which causes an inclined rod to reciprocate or move backwards and forwards. At the upper end of this rod is a slot, oblique to the length of the rod. Midway upon the rod stands a projection ready for lifting the bar out of a notch at the proper time, and liberating it. A lever fastened to the oscillating shaft carries a stud, which fits into the oblique slot in the rod, and the weighted lever also fixed on this shaft keeps the stud pressed against the outer end of the slot, so that the shaft is rocked by the reciprocating movement of the rod.

The knocking off action may be illustrated by the back stop motion. The cotton sliver passes over a spoon lever, each separate sliver having a separate spoon. This spoon is kept down by the weight of the sliver when not broken, but if the sliver breaks or the can becomes exhausted, so that there is no cotton passing over the spoon, the weighted lower end or lever is pressed down, the front part rising. This lever is then brought in contact with an arm projecting from the back of the shaft, and thereby arrests the rocking of the shaft. The stud thus becomes stationary, and the rod, continuing its reciprocating motion causes the oblique slot to make the upper end of the rod to rise, and so brings the projecting snug up against the bar, which, being then lifted and liberated from its notch, shifts the driving strap from the fast to the loose pulley.

The front stop motion is a funnel shape guide, through which the drawn sliver is passed on its way from the front roller to the pair of calender rollers. The sliver passes in at the large end of the funnel and out at the small end, which is contracted until it requires a considerable pull to draw the cotton through it. The guide is carried on the front end of a lever, of which the back end is the heavier, and tends to tilt the guide upwards.

The reciprocating rod is connected with an arm on the oscillating shaft, having a notch in its front end. The heavy tail of the guide lever arrests the motion of the rod, and therefore of the shaft and stud. This brings the stop motion into action, as before described, and at once stops the machine.

The can stop motion consists of a false bottom to the coiler wheel. The plate forming this false bottom is weighted by a ring above, which is varied in weight to suit the counts of the sliver. The finer the sliver, the lighter the ring. Fine drawn slivers

will not admit of being pressed so tightly in cans as the coarse ones. When the can is filled sufficiently to lift up the loose plate close to the coiler wheel, a vertical stop is raised in front of the end of the reciprocating bar connected with the oscillating shaft, and the machine is stopped as before described.

Answers to Questions Set by the City and Guilds of London Institute.

Question: Describe briefly the method of preparing and spinning waste yarns suitable for wefts and flannelettes.

Answer: The machines used for preparing waste differ very considerably from those for raw cotton, viz., an Oldham willow and a hard waste machine with three cylinders, if hard waste be used, to start with. The material is then made into a mixing, with 10 per cent., by weight, of soft soap water. This stands for 24 hours to get moistened all through. Additional machinery is now required, as a hard waste machine with lap; single scutcher, doubling three laps into one; a card, 48 inches on the wire, delivering into a can 36 by 9. Sixty of the latter go to a doubler making laps 22 to 25 inches wide. Two laps from here go to the finishing card, which delivers into a Tatham card feed, with four coilers or cans. The latter go behind a frame 8 inches lift, 6-inch space. The bobbins from here go to a mule or billy, having the space between spindles, 2 to 2½ inches. Or, when leaving the doffer at the finishing card the cotton passes through a condenser, by which means the web is cut up into strips from 14 to 50, according to the weight per yard required. After the sliver leaves the dividing tapes it passes between broad bands of leather, very smooth on their surface, and then over rollers to which a rotating motion is given. Thus the sliver is rubbed up between the leather and formed into a roving, and then wound onto bobbins. These bobbins are from 24 to 30 inches long, and from 14 to 30 ends are wound on to each one. These are put into a creel to be spun on a billy of about 500 spindles long. The principal difference between a billy and a mule is, the billy has only one pair of rollers,—there being no draft required here,—the reduction of the roving being accomplished by the rollers turning out a certain length of roving, and then stopped, allowing the carriage to draw down the roving to the required count, the twist going in with the revolution of the spindle, in the usual way.

Question: How would you proceed to grind the clothing on a carding engine cylinder, (1) when newly put on; (2) after continued use? State the reasons for the course you may adopt.

Answer: When the cylinder of a carding engine is newly covered, a number of the points of the wire will be bent, and these should be brought up to their proper position. The cylinder is started to run in the same direction as when working, and the long roller, sometimes called the dead roller, is put on to grind. This is called facing the wire up. When this has been grinding a few hours, the cylinder is reversed, and made to run in the contrary direction to that when carding. After the wire has been ground with the long roller, the latter is taken off and the grinding disc put in its place. By this roller we get a better point of wire for carding purposes than we can get by the long roller. If we were to grind the wire after ordinary wear, we should first stop the feed, and let the other parts of the card run for a short time, in order to clear the wire from all cotton. We should then put on the disc grinder after reversing the cylinder, — for the grinding point should always be done with the cylinder running in the opposite direction to that when working, in order that the wire be ground from the back part and not from the front. Some cards are prepared with a slow grinding motion, and we think this is preferable. The thing being ground should always run slower than the grinder.

Question: For what reason is a

traveler of a certain weight selected in spinning any given counts of yarn? Is it ever necessary to change the weight of the traveler, if the counts spun are constant? Why?

Answer: The traveler on a ring-spinning machine acts a very important part, and its function is not yet quite clearly understood, even by practical men. The writer had occasion a few years ago to take a number of his students through some machine works where ring-spinning machines were being made. A short time previous, the lesson in the class had been on the ring frame, and the students were told that one of the functions of the traveler was to put in the twist. The manager of this machine shop was asked by one of the students, what puts in the twist, and the reply came at once, the spindle. Now the answer was given without a thought, and afterwards the opinion of the manager was changed. But besides that of twist the traveler acts as a drag, in order to wind the yarn on the bobbin at a proper tension. If the traveler be too light then there will be too much ballooning, and the yarn will be in danger of running into one another, and also will be wound on the bobbin too slack, making a bad bobbin and giving trouble in the next process. If the traveler be too heavy, there will be too much drag, the yarn will be wound on too tight and be stretched or broken. So it is very important that there should be a proper grading of the traveler, and they are now numbered according to the counts about to be spun. Sometimes it happens that the traveler requires to be changed even when the counts of yarn be uniform. If a change of cotton has been made, and a greater or less loss takes place in working, this is not often done; but where a change had taken place from a harsh, hard cotton to a soft and pliable one, then, even with the same counts, a change of traveler might prove beneficial.

Question: Suppose you were spinning on a self-acting mule 150s yarn, how would you arrange the mule as to draft, gain, and spindle speed? Why?

Answer: In setting out a mule to spin 150s yarn we should be aware that the cotton from which it must be spun would be long in staple, either all Sea Island, or a mixture of Sea Island and good Egyptian. In that case it would stand a longer draft than cotton with a shorter staple, and we might have a draft in the rollers of 15 or 16. These fine counts must be spun from double rovings, and with 1.6 of a draft in roller, and 18 hank roving in creel, with the gain in carriage, would bring it to about 150s yarn. To have a greater amount of gain in carriage than a shorter staple would stand, would be beneficial to the yarn, as we should get a much more level thread. The gain in carriage most suitable would be 1.09. Regarding spindle speed instead of running the spindle 8000 or 9000 revolutions per minute as in the case of say 60s, we should run it about 6000 revolutions per minute; the reason being that such a fine, delicate thread has to be treated much more carefully than that which is coarser. In this case quality has to be considered; in the other, quantity.

Question: A drawing frame has four lines of rollers as follows: First line, rollers 1⅜ inches diameter; second line, rollers 1¼ inches diameter; third and fourth lines, rollers 1⅛ inches diameter. Could you draw Indian cotton with these properly? How would you set them? If not, why not?

Answer: No. Indian cotton could not be drawn properly with rollers of the diameter given. The distance of rollers depends upon four conditions, viz., length of staple, weight going through, amount of draft, and amount of twist in roving. Of course, in the draw frame this last condition may be dispensed with, as there is no twist put in up to this point. Taking the first condition, length of staple. The best Indian cotton is from ⅞ to 1 inch in length. This is its maximum. We should be nearer if we took the length

at 7/8 of an inch. For this length of staple, the distance from centre to centre should be 15/16 of an inch, which is allowing 1/16 over the length of staple. But the weight going through, and the amount of draft must also be reckoned with. In the draw frame, the weight going through is always very considerable, but with Indian cotton, coarse counts must necessarily be spun from it; and the sliver at the draw frame must be heavier, than if finer counts were to be spun. Also the third and fourth lines of rollers have a very small draft. For both these reasons the distance between third and fourth lines must be greater. We will then allow 1/8 inch for them. This would bring the distance 1 1/16 inch, which would be a good working distance for the two back lines of rollers for Indian cotton. But the distance of the two back lines, given in the question before us, would be 1 3/8 inches if close together, and we must allow 1/16 inch for clear working, which would give 1 7/16 inches distance from centre to centre, which would be a great deal too far apart to work properly. Again, the two front lines, or, as the question puts it, the first and second rollers, are respectively 1 3/8 inches and 1 1/4 inches diameter, which, if close together, would be 1 5/16 inches from centre to centre; and allowing 1/16 inch for working space would make 1 3/8 inches from centre to centre of first and second rollers. Now, these two rollers ought to work nearer together than the two back lines, for the reason given above. The weight is not quite so great, the two back l'nes having drawn the sliver a little finer. Again, there is a greater draft between the first and second, that requires the rollers to be a little closer, but the distance between centre and centre must never be less than the length of the staple with 1/16 added. But this would only be 15/16 inch as we have seen in the last case. So there would be a difference of 7/16 inch between the distance required, and the distance there would be with these diameters of rollers. So we conclude that these rollers are too great in diameter to draw Indian cotton properly.

Question: What is the object of a stop motion in a drawing frame? At what point does it act? Describe any motion with which you are acquainted.

(Continued in September Number.)

Short Weight in Cotton.

We understand that much of the cotton that has been arriving at the Northern mills falls short in weight to an unusual extent, which gives rise to much discussion as to the cause of this shortage and the responsibility of the loss. It is said that the dry season in the South last year left the fibre more susceptible to heat and the consequent shrinkage, and the necessity of leaving the cotton in closed cars, side-tracked in the sun, increased the shrinkage. This has varied up to 16 pounds to the bale, and an average of 10 pounds would mean two bales in a hundred. The mills look to the brokers to make good the loss, and the brokers look to the shippers in the South, who are in no way to blame for the loss.

There is a tendency to lay the blame on the railroad at first sight, but in its behalf it is argued that cotton in cars is stalled along the road because the mills do not move that which is landed in the freight yards fast enough to make room for the new arrivals. The same would be true in a measure even if the freight sheds were removed. If a demand for damages is made of the railroad the latter is in a position to charge for demurrage, as is charged in many other cities along the line. The situation is somewhat perplexing, and the Southerner is forced to pay for the mills' delay in removing cotton, notwithstanding the counter claim that is set up on the shipper's behalf that if over weight and short weight bales were to be averaged the mills would find themselves receiving fully as much cotton as they pay for.

WOOLEN DEPARTMENT.

Ingenuity in Modern Textiles.

CHARLES E. WILES.

ARTICLE VI.

(Copyright.)

Ladies' Dress Goods: The fabrics for ladies' wear, submitted by the leading producers, are, besides being multitudinous almost infinite in their variety, rendering their classification and individual selection for the purpose of treatment in one or two short articles, a task of some difficulty.

A description of the mysterious train of operations by which it is possible to convert a last winter's discarded and worn out garment into a brand new habiliment for next spring would be received with amazement, almost discredit, were it not that it had grown quite a commonplace affair, affording means of subsistence to hundreds of thousands of unskilled toilers. But this is only one of the contributory elements to the dress trade. The representative textile fibres of the whole animal and vegetable kingdom are also to be encountered, each being employed according to the special effect or texture desired, and with the inclusion of such extraordinary articles as wood-pulp silk, spun glass, and even spiders' webs, it would appear that practically anything and everything might, in the course of time, play some sort of a part in the evolution of the dress industry.

Then again, as to the huge amount of material required,—not only are there considerably more women to be catered for in the world than men, but it is also a growing practice for them to adopt cloths for such purposes as, say, tailor made costumes, which have in all probability been originally intended for masculine wear, whereas the same facilities for interchange of clothing material are neither afforded nor indeed permissible, from our standpoint.

Now, regarding the novelty and ingenuity observable about these productions of the loom,—for novelty and ingenuity are assuredly present,—they must be the outcome of four or five technical elements taken either separately or in combination. Firstly, the yarns employed; secondly, the design—considered from an artistic point of view; thirdly, the weave; fourthly, the coloring; and lastly, the finish.

Nowadays, however, the newness of style and appearance is in too many cases arrived at by a system of procedure similar in principle to that which evolved the aforementioned spring suit. The rapidity and cheapness of production which must be maintained in order to keep pace with the commercial rush of today are serious factors to be contended with. There is not sufficient time for the inventor and designer to thoroughly study out new schemes and methods, and supposing there were, it is perhaps somewhat doubtful whether the labor would be found sufficiently profitable to merit continuance. But in very few instances, indeed, will brilliant successes be achieved in textile productions of any kind without long and careful forethought and experiment, assisted by thoroughly grounded technical knowledge.

The few typical fabrics to which allusion will be made in this article will illustrate what may be accomplished in the way of novelty by judicious selection of yarn materials and their arrangement in conjunction with comparatively simple crossings.

Light weight goods either in mixture yarns or for piece-dyes rely chiefly on their color, sett, and finish

to be salable, and it may be well to give one or two examples of such makes which are at present upon the markets.

No. 1: Is a mixture tweed woven from plan 1 in conjunction with the following particulars:

Warp: All 32 skeins—green and blue mixture. 9s reed 4s.

Weft: All 32 skeins—green and brown mixtures. 36 threads and picks per inch; tweed finish.

No. 2: Would be suitable for a covert coating style; the weave used being the weft prunelle shown in plan 2.

Warp: 40 skeins—dark mixture. 15s reed 3s.

Weft: 40 skeins—dark mixture. 45 threads and 56 picks per inch. This, when milled and slightly raised in finishing gives a fabric of satisfactory softness yet very firm in construction.

No. 3: A good piece-dyed habit cloth. Might be made from plan 2, by employing 50 skeins wool for warp, set in a 20s reed 3s, with eighty picks of single, 48s worsted, for filling; milled slightly and raised sufficient to impart a cover to the weave.

No. 4: Is a suitable arrangement for a light French cashmere style.

Weaving Plan: Warp prunelle, plan 3.

Warp: All single, 80s worsted. 26s reed 6s.

Weft: All single, 50s worsted. 156 threads and 60 picks on the inch.

No. 5: Piece-dye serge, woven from the two and two twill.

Warp: All 2/60s crossbred wool. 14s reed 4s.

Weft: Same as warp. 56 threads and picks per inch. (The number of threads and picks per inch may be increased if a less open fabric is required.)

No. 6: Also adaptable for piece dyed goods, woven in the plain crossing, using 2/16s worsted for both warp and weft, sleyed 12s reed 2s, with 24 threads and picks per inch.

No. 7: The plan for this (Fig. 3A) is developed in curl and knop yarns, giving an interesting rough broken effect.

Warp: All 5s worsted (knop yarn) dark blue-green shade. 10s reed 2s.

Weft: 1 pick, 5s worsted (knop yarn)—black. 1 pick, 2½s worsted (curl yarn)—black. 20 threads and 17 picks per inch.

Those fabrics which depend upon suitable arrangements of color for their chief characteristic have been greatly in evidence during the last few seasons. In addition to the many standard varieties of clan tartans which are offered, other plaid styles are produced by substituting different shades in place of the standard colors, but maintaining the same arrangement of them throughout. It will readily be seen that by adopting this course it becomes a simple matter to place practically any number of different patterns upon the market, and the sale of some of the smarter types, woven in plain or common twill with worsted yarns and embellished with silk or mercerized cotton overcheckings, has been phenomenal.

Coming to the figured fabrics it is interesting to observe how much may be effected in the way of ingenuity by extending or modifying the ordinary plain crossing. An example is given in Design 4, which is complete on 72 threads and picks. Here the figuring is all obtained either by the addition to or erasure of dots from the plain foundation weave. Designs of this class require producing either in different solid colors of warp and weft or in special arrangements of threads; they are not well adapted for goods of one color throughout.

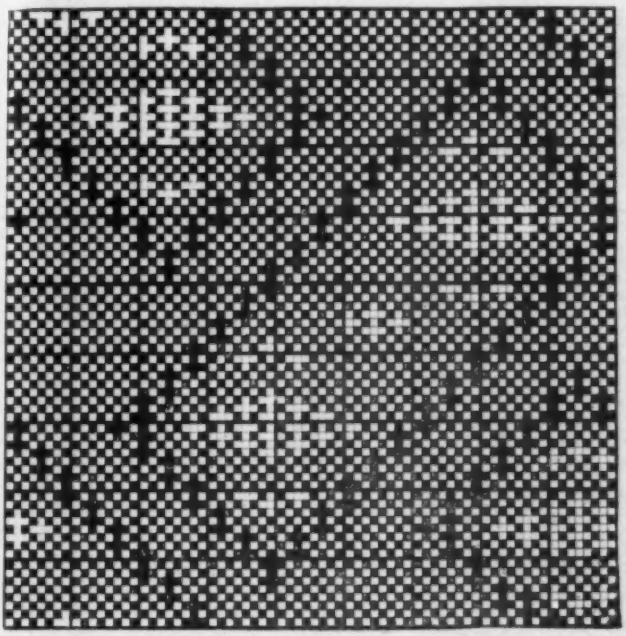
The following weaving instructions for this particular design will assist in showing the methods employed in working out similar patterns for the loom, since it is possible, by the exercise of a little skill in planning the figure arrangements, to obtain many excellent and salable designs from this base alone. The weft is responsible for one portion of the figuring, the warp for the other, whilst both

series of threads intermingle to make the ground.

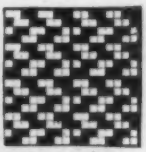
Warp: 1 thread of 40s single worsted—black. 1 thread of 60/2 spun silk—heliotrope. 1 thread of 40s single worsted—black. 22s reed 3s.

Weft: All 40s single worsted—black. 66 ends and picks per inch.

Plan 5 is a smaller one, adapted for shaft-weaving and might be woven in the same counts and setting as number four, using a solid light colored warp and dark weft.



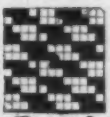
DESIGN 4



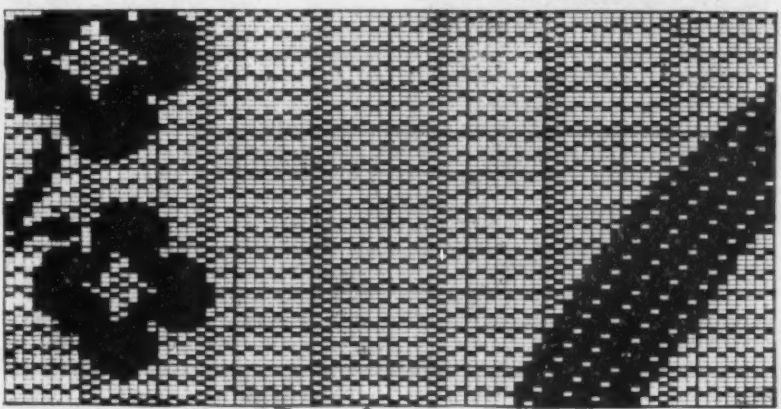
PLAN 1

PLAN 2

PLAN 3



PLAN 3A



PLAN 6

Some ingenious figured cord styles may be included here as they are in reality modified plain structures; for example—two-pick work, plain, and the succeeding two flush under-

neath in each section of the cord. These two flushing picks serve to pull the edges of the plain together thus forming the fluted effect. A portion of a figured style is worked out in plan 6 and a sketch of the full pattern as it appears when woven is given at Fig. 7.

Weaving particulars suitable for this type of design are as follows:

Warp: All 2/100s worsted—light fawn shade. 21s reed 4s.

Weft: 2/100s worsted—dark fawn

FIG. 7.

shade or black, 84 threads and 140 picks per inch.

The figuring is thus brought up by the dark weft on an intermingled ground. Additional attractiveness may be lent to the pattern by employing brightly colored threads of worsted or silk in those places where the warp yarns work plain in pairs to form the furrows.

In plan 8 is given an elementary illustration of the combination of plain weave with warp cord, two picks in a shed. This style of pattern is often employed in the production of broken or mixture effects in solid shade warps with filling of a different color. The success of this class of design depends chiefly on equal distribution of the weaves which are used; they should not form, when repeated, ungainly stripes or bars, but should produce an evenly intermingled appearance all over. In plan 8 satisfactory distribution has been arrived at by using the six shaft sateen crossing as a basis for the patches of warp cord, but in making larger designs it is advisable to prepare a preliminary indicative of the positions to be allotted to the various weaves employed.

Weaving particulars for plan 8.

Warp: All 30s worsted—medium green shade. 25s reed 4s.

Weft: All 50s worsted—dark crimson shade. 100 threads and 70 picks per inch.

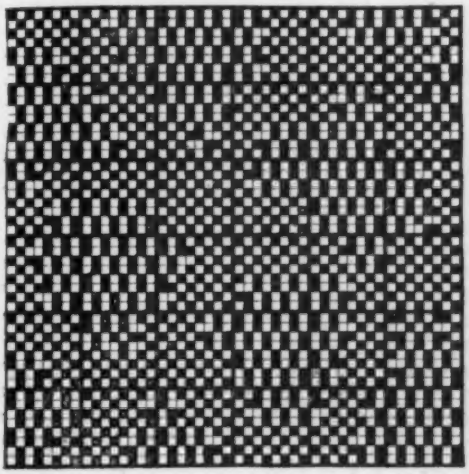
The next design, Figure 9, owing to its being composed of both warp and weft cords, gives a much more pronounced effect when woven in different colors of warp and weft than is the case with No. 8. Designs of this stamp should preferably be much larger in size than the example, as, unless this is so, their appearance in the woven fabric becomes very indistinct, due to the small number of threads occupied by a repeat of the pattern.

It is only possible, by reason of the unavoidable restrictions of reproduction, to illustrate the different makes by either small designs or sections of large ones, and, in most cases, it has been deemed advisable to give as far as possible a complete plan, however small, to a sectional one which may not so readily be understood.

A useful fabric may be made from plan 9, by employing a 2/16s worsted warp (black), set in a 12s reed, with two threads through each dent, the filling to be 2/16s crimson yarn with 24 threads and picks per inch.

Certain ingenious textures are produced in the plain crossing by using heavy yarns which are secured firmly in position by others so fine as to be more or less unnoticeable. One fabric in particular, the writer recollects, which came under his notice some

time ago. The warp was arranged one thread of black spun silk (about 60s twofold), one of a thick yarn, silver gray in color, and equal to about a 2/12s worsted, and another of 60s two-fold black silk. Weft ways the same arrangement was adopted and there were twenty-four threads and picks per inch in the finished cloth. As the weaving was all plain the fine silk yarns held the larger ones in their respective places, and, besides giving firmness, they produced an original effect where they crossed the worsted, the latter being cut up into knob-like prominences over the surface. A soft roving yarn would be the best adapted for producing this and similar effects.



PLAN 8

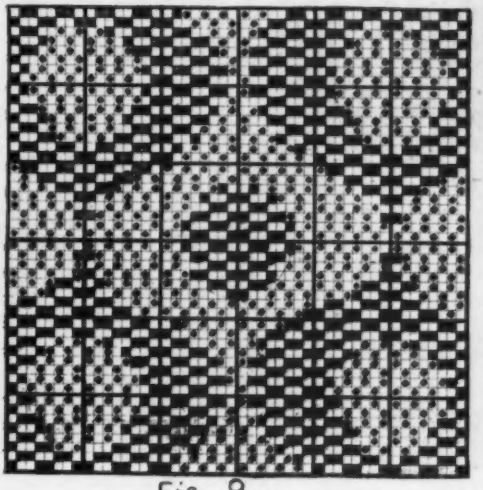


FIG. 9

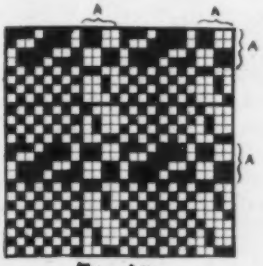


FIG 10

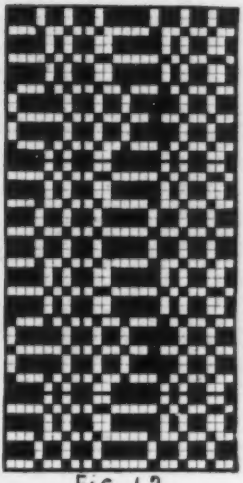
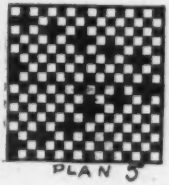


FIG 12



PLAN 5

The idea is further developed in the two check patterns given at Figures 10 and 11. In Figure 10 the plain portions should be brought out in silk warp and weft, the adjoining four picks and threads (letter A) being of a thicker yarn contrasting in color.

A short study of the weaving instructions here appended, aided by reference to Fig. 10, will enable the reader to gauge approximately the effect.

Warp: (commencing from the left hand bottom corner of the plan.) 8 threads silk, about 6 or 7 drams per 1000 yards—grass green shade; 4 threads 2/36s worsted—black; in a reed with 18 splits per inch, 2 dents with four ends per dent and 2 dents with two ends per dent.

Weft: 8 picks, 6 or 7 dram silk—white; 4 picks, 2/36s worsted—black. 56 threads and picks per inch.

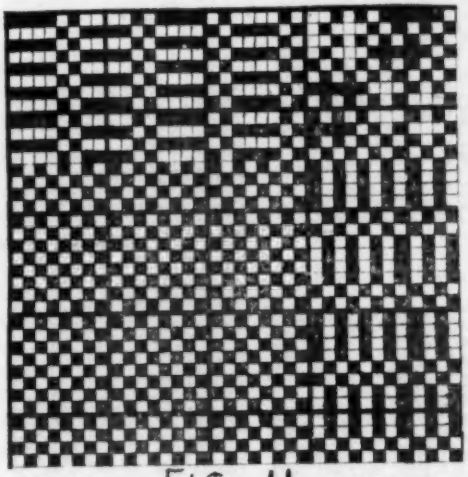


FIG 11

Design 11 is a larger check, giving, when correctly woven, a most attractive form of dress fabric.

Warp arrangement:

24 threads 6 dram silk—petunia shade.
1 thread 2/36s worsted (doubled)—black.
2 threads 2/60s cotton—black.
1 thread 2/36s worsted (doubled)—black.
2 threads 2/60s cotton—black.
1 thread 2/36s worsted (doubled)—black.
2 threads 2/60s cotton—black.
1 thread 2/36s worsted (doubled)—black.
2 threads 2/60s cotton—black.
Sleyed: 16½ reeds per inch.
6 dents with four ends in a dent.
4 dents with three ends in a dent.

Weft:
24 picks 6 dram silk—peacock blue shade.
2 picks 2/60s cotton—black.
1 pick 2/36s worsted (doubled)—black.
2 picks 2/60s cotton—black.
1 pick 2/36s worsted (doubled)—black.
2 picks 2/60s cotton—black.
1 pick 2/36s worsted (doubled)—black.
2 picks 2/60s cotton—black.
1 pick 2/36s worsted (doubled)—black.
60 ends and picks per inch.

The plain section of the pattern is therefore developed in silk only: the portion in the top right hand corner of the plan brings the thicker worsted yarns on the surface, covering up the cotton, and the two other parts of the design appear as a pleasing fancy effect due to combination of the three kinds of threads.

Figure 12 is a small cross-over design which does not perhaps at the first glance seem to be in any way connected with previous modifications of the plain weave, but a detailed inspection will show that there is really a good deal of this crossing about it, the altered appearance being due to working some of the threads and picks in pairs. It produces a very neat pattern composed of alternate stripes of cord and waved effect and a study of its anatomy should furnish ideas for further developments. The weave is complete on 12 threads and 24 picks.

Weaving particulars:

Warp: All 2/100s worsted—dark blue. 20s reed 3s.

Weft: All 2/120s worsted—dark blue. 60 threads and 108 picks per inch.

Before concluding this article mention may be made of a type of fabric which has comparatively recently been patented by a Bradford firm, and for which the writer understands there has been great demand.

The name which has been bestowed upon this particular production is almost as mystifying as the production itself, but the "Iroganil Glystre" as it is termed may be more explicitly defined as a combination of gauze and printed cotton. The gauze is of the ordinary make produced with doups, and the printing of the cotton is done in special manner with a view to obtaining certain effects when the cot-

ton gauze is superimposed.

On this being done an interesting moire or watered effect results which undulates and varies in endless fashion as the fabrics are moved. The two structures are made up for wear as though only one were being used and the perambulations of the wearer of such a costume give rise to an ever-changing variety of pattern. The three photographs in connection with this short description will help to afford a clear conception of this unique invention as they have been taken direct from a sample of the goods. Figure A is the gauze texture of black cotton, Figure B shows the printing in black ink on a woven cotton ground either white or tinted, and Figure C illustrates very apparently the effect produced by simply placing the one on the top of the other.

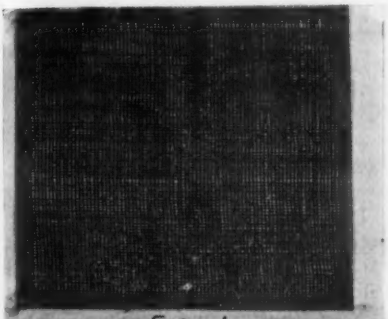


FIG. A

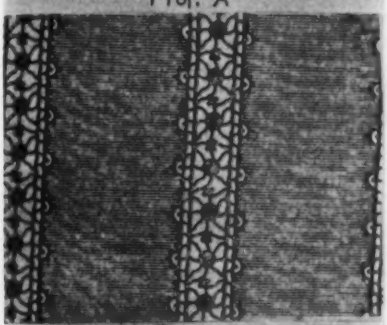


FIG. B

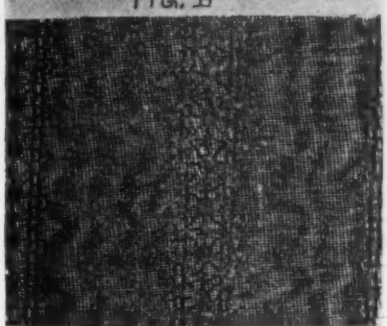


FIG. C

(To be continued.)

Wool Carding.

Many articles have been written in years past upon the subject of wool carding, and many of them have failed to give carders who were in trouble any assistance. There is no help derived from an article that tells us that if a card is in such a condition we will get good work; rather, it should tell us how to put it in that condition. The improvements and facilities afforded the carders at the present time to do good work are far greater than in former years.

There is a great difference in the construction of woolen cards built at the present time and those built 75 years ago, or about the time the ring doffers were invented. If a set of cards built in those days were placed beside a set built at the present time it would cause great amusement. Cards in those days were not substantial, wooden arches were in use, and the parts for adjusting were frail and unreliable. The stock was fed by hand to the first breaker, the second breaker and finisher were fed with laps which would be considered very dangerous at the present time from which to get even yarn, but they had expert tenders in those days and succeeded in getting very good results.

When drawing was introduced to take the place of laps, the stock was taken off into a tube in front of the doffer and guided on to the spools by what was called an endless screw like the one used in the hardy grinder. The roping was condensed with tubes driven by listing bands from a roller under the bottom doffer. Each band

drove two tubes; to drive the top tubes the band passed up through the lower tube box. Many of the bands would break and go into the card. The ring doffers were eight inches in diameter, and speeded about eight turns per minute. The main cylinder turned seventy revolutions per minute. Very few of the cards were over thirty-six inches wide.

Very few if any turning lathes and emery cylinders were in use at that early time. The turning was done with a carpenter's plane moved on wooden rests. The grinding was done with what was called a straight edge or slats; one side was covered with emery. Several of these slats were attached to the poppet head stubs to grind the main cylinder. The small work was ground on a frame rigged up in the same manner.

The card clothing in those days was far from its present perfection. The leather was perforated, and the teeth cut off and bent by machinery, and then set by hand, and afforded employment to many families in the town. The clothing was rough and uneven and it was the custom to face it down even, then reverse and grind until the surface looked dark and no shiny points seen. There would be heavy marks left by the emery, and these had to be ground out by what was called a fiddle, and sometimes it required two or three days for the main cylinder. When these marks were all out they had a working point that is not surpassed at the present time. Later the tubes were displaced by the three roll condenser which was the beginning of improvements for a greater production, that has been followed up to the present time.

The carders as a general thing in those days were required to learn their trade thoroughly or they could not get the charge of a room very easily, and as a general thing they were more mature in years than at the present time.

Gauges for setting cards were not used in the earlier days. This was done by the practiced eye of the carder and it was done well. Few carders at the present time have any knowledge of the difficulties that confronted the carders in the earlier days. Besides the crude machinery, and the poor facilities for operating it, they were greatly troubled with burrs, no matter how good a condition a card was put in. In a day's time its condition would discourage the most patient carder at the present time. Emery boards had to be used to bring the teeth into place.

The breakers, and sometimes the finishers had to be cleaned with a comb. About the year 1844 the burr cylinder and guard was invented and attached to the first breaker. This was a very important invention, as it greatly improved the quality of the work, and increased production, because the cards could run much longer without stopping for repairs.

Many mill men have entertained the idea that the carding in the earlier years was poor in quality, as well as small in production, and the carders were charged with incompetency, for they had the best of stock to work, while at the present time it is quite the reverse. It is doing a great injustice to the carders of those times, for they had to contend with crude machinery, and poor facilities for operating it. The work in those days, under the circumstances, would compare favorably with that of today with substantial machinery eminently fitted with every improvement to handle all kinds of stock. As time goes on there will be many more improvements needed to meet the constant demands for improved quality and production and lower expenses.

In former years carders were loth to adopt many of the improvements which are now in general use. Twenty years ago a great many Apperly feeds were thrown out as useless, while in recent years nearly all have been returned and hundreds of new ones besides, and all the best mills are using them. It was preju-

dice, and not the construction of the Apperly feed, that prevented the merits of the device being developed earlier; for there are many of the old ones running successfully at the present time.

PROGRESS.

Sheep in Africa.

A writer on "The Wool Industry of South Africa" in the "Windsor Magazine" for April, says that it is not all parts of South Africa, that are suitable for sheep farming. The animal will not thrive where grass is rich and "sour." The best sheep runs are in the Karoo, and there are now depastured over its plains nearly six millions of fine-wooled sheep, in flocks ranging from 1,500 to 20,000, besides upwards of 2,000,000 of "fat tail" breeds and numerous herds of goats, cattle, and horses. These sheep runs are something different from ordinary pasture in England. The run frequently extends over a tract of country of from 5,000 to 20,000 acres. In many places where sheep pay best the run will not bear more than one sheep to two acres, such is the scanty nature of the herbage. Sheep farmers shear twice a year, and the wool is usually sold by the owner to the nearest shopkeeper. Sometimes the farmer takes it to the nearest town. In olden times he usually ran up his account and paid it in wool: now he can often take his wool to some shop further away, where he gets a better price. The shopkeeper sends it to the nearest railway done up in large bales; it is then carried near to the sea-coast and washed. The most important wool-washing centres are Uitenhage, near Port Elizabeth, King Williamstown, near the frontier—the waters there possessing in a marked degree the peculiar qualities desirable for the successful operation—and, in the western province, the foot of Michell's Pass in the Tulbagh Basin, one of the loveliest places in the world. The wool when washed is dried by rotary machines regulated to a set speed that allows of a certain amount of oil remaining in the wool. It is tightly bound with iron bands and pressed by hydraulic force until it occupies about one-sixth of the space. It is then ready for export. Port Elizabeth is the principal place of exportation for wool, as all consignments from the Free State and the Transvaal are brought there. From East London, Cape Town, Mossel Bay, and Port Natal, quantities of wool are also shipped.

Angora Goats.

We have had a number of inquiries of late in relation to the raising of angora goats in the state of Maine, in which C. J. House, of Augusta, is alleged to be more or less interested. It appears that all of this story about raising angora goats in Maine originated in the office of a newspaper in Bangor, Me. It seems that the editor of a local paper supplements his meagre salary by writing amusing stories for the readers of the Saturday edition of the New York Sun, and his motto apparently is to keep as far from the truth as possible. He usually works in the name of some well known individual, in order to give the story a semblance of truth, and in a recent instance he has used the name of C. J. House, Chief Clerk in the Bureau of Industrial and Labor Statistics, Augusta. Sometimes this editor takes some incident that has actually transpired for the foundation of a yarn, but the goat story was manufactured entirely out of whole cloth, the keeping of goats never having entered the mind of Mr. House; and no allusion to goats was ever made by that gentleman to this newspaper scribe, or anyone else.

—"The use of the spinning wheel," wrote the "Boston News Letter," in 1770, "is now encouraged, and the pernicious practice of tea drinking discountenanced by all the ladies of the town excepting those whose husbands are Tories and friends to the American revenue laws."

KNITTING DEPARTMENT.

The Knit Goods Situation.

Considering that this is the vacation season, when stagnation is always rife, values and undertone are surprisingly firm. The confidence begins with raw materials, which have had the benefit of bullish tendencies.

For instance cotton has been helped by the Texas floods, while wool hardened on reports of the London sales.

Cotton yarns are in fully average request, with stocks in easy shape for handling. Worsted yarns move readily on slight concessions. Spinners, while confident, are inclined to assist manufacturers to a profit, which with stiffness on spinners part would be microscopic.

Underwear was wonderfully helped by the extremely high temperatures of early June, which cleared light weight stocks as if by magic. This movement came in most opportunely, for about this period cutting of prices is as natural a development as that tired feeling in spring days.

Ribbed and fleece goods, of course, are in the best condition. Even flat goods show an improvement, brought about by reduced production.

The last few weeks have brought unprecedented demands in light weights for tinted goods of such shades as pale blue and green, pink, silver and amethyst.

Ingenuity extends itself to lace patterns, fancy ribs and drop stitch effects, all with endless variations. The popularity of lace effects is extending into men's goods, strange as it may seem. The perforated coolness of lace has done more to recommend it to men, than its appearance. There will be more, rather than less variety in styles and colors among light weights next spring.

Checks and stripes show popularity, but the main draught has been on light tints, which are surely in for a run. More and more is seen of mercerized goods of better finish.

Spring samples are not being brought out as early this summer as usual, largely because the trade is satisfied to let well enough alone, after the generally satisfactory whirl of the past few weeks.

Imported underwear too is between hay and grass. Arrangements now in progress, however, show that the trade is preparing for more business than for several seasons.

Hosiery has been strengthened by recent advices from Chemnitz, which are in keeping with those of the two months preceding. With every advance more orders are placed and there is nothing to indicate that the end of the upward turn is in sight. Higher wages are being granted there. Orders for lisles and open work effects are prominent in the foreign demand. Some disposition to handle more fancies is noted by importers, but the movement possesses little significance and ought not to be misinterpreted.

As in underwear, there is increasing opportunity for mercerized goods of satisfactory quality. The seamless and full fashioned branches of the business are improving for wide awake manufacturers. The needless price cutting that has prevailed in the full fashioned trade, however, furnishes a shining mark for improvement. In the seamless end, the better grades have been strangely ignored.

Usually at this season sagging is likely to take place in the market, but this year the reverse seems true. The trend is slowly but steadily upward and only slight reactions seem probable.

—The entire sum annually laid out in colonial days by a New England farmer on clothes for himself, his wife and his eleven or thirteen children was ridiculously small.

Fleece Lined Underwear.

The fabric which has attracted the greatest attention during this season, for the winter trade, in the line of knit shirts and drawers for gentlemen, is that known as fleece lined. These goods, properly speaking, should be styled plush. For it is not a fleece lined article as many take it to be, not knowing how it is done. Let me say to such that it is a plush knit garment, with a fine thread on the face, which can be made from either all wool, cotton, or a mixture of both, but the cheap goods are all cotton, back and front. There are some mills I know of that are making a face of silk, and a wool and silk back, and some all soft spun silk, which is a delightful article that sells at a good price, or from $20 to $24 per dozen at wholesale. The yarn for the inside, or back, is spun soft and heavy; the stitches are floated and knit with a plush wheel. The all cotton and cheap shoddy goods are made after the same manner, and some are sold, and orders taken, as low as $2.87½ cents, which is a ruinous price, and should not be marketed at less than $4.50 less ⅛.

When the knitted goods are turned and put on a machine, napped and brushed, light or heavy, to suit the customers, they are known as fleece lined.

This season undoubtedly was one of the most peculiar ever experienced in the knit goods trade in underwear, for the opening of the season indicated a large business on all grades, but buyers soon were struck at the prices fleece lined goods were offered at, so they took to them and ignored others. Instead of buying a number of lines, as heretofore, they confined themselves greatly to this article, for a time, but the number and variety of different lines of fleece goods led to sharp competition, and the prices were ruinous. The cause of this is easily explained. Some of the manufacturers made a mistake in estimating the cost of this line of goods, and in the future will be more particular. Buyers are becoming more critical every season, because of the large number of styles and grades of goods. Some of the fleece-knitting mills were operated day and night early in the season, but it was not long before they discovered they had made a blunder.

In this article I shall not criticise, or purpose to give advice, one way or the other, as to whether it is good policy or not to operate plants day and night, only I have had considerable experience in mills for many years, and I believe that all night work is poor policy, taking everything into consideration, and many instances I could quote where it proved a decided failure. One in particular, where I had worked for years, 33 years ago, in Cohoes, the great knit goods centre. After running four mills or twenty-two sets of carding and spinning, one of the mills, running day and night with eleven sets for two years, failed for over one million dollars. I don't want it understood that night work was wholly the cause of this.

SCOTLAND.

Lace Edging Combination.

Announcements were made in July of the consolidation of several important edging plants with that of Friedberger & Co., under the style of the Friedberger Mfg. Co., viz., George H. Baker's edging plant of Woonsocket, R. I., and the edging plant of the Krout & Fite Mfg. Co. of Philadelphia. In announcing this important consolidation, the Friedberger Mfg. Co. state that competition in the edging business, which is in itself not a very large one, has involved useless expense upon the few concerns engaged in the business. Styles have been needlessly multiplied, and the net result is considerable waste; all of which will be avoided to the ultimate benefit of the consumer.

The Friedberger Mfg. Co. is now in

a position to accept orders for any patterns heretofore made by the Krout & Fite Mfg. Co. or Friedberger & Co., at the same prices previously quoted, and the trade will be glad to learn that no advance in prices is or has been contemplated. Eventually, all three of these edging plants will be consolidated at the factory at 18th and Fisher's Lane, Germantown, where extensive additions are being made to the former plant of Friedberger & Co., with the result that the new company will be in such a position as to take care of all orders better than ever before, no order being too large and none too small for them to execute. The consolidation will effect certain economies which may result in enabling some patterns to be sold at even lower figures than heretofore quoted and yet more satisfactory to the manufacturers.

In their circular announcing the consolidation, they assure the trade that no burdensome trust or combination is intended, but that the general effect will be beneficial to all concerned.

We understand that the knitting plant of George H. Baker is not included in the arrangement, nor the tape, binding and braid department of the Krout & Fite Mfg. Co.

Knitting Loom.

We illustrate, herewith, an interesting knitting machine of a kind known as a "knitting loom," for producing fabrics analogous to woven fabrics. The principal object of this machine is to provide one of a simple and reliable character, which shall be capable of producing a great variety of fabrics, including cloths resembling the well-known diagonals.

Up to the present it has not been possible to produce diagonal patterns in knitted fabrics; but according to the present contrivance this result is obtained by arranging the loops of the knitting weft-threads so that those in one row alternate or break joint with those in the adjacent rows. This can be readily done by means whereby certain of the needles are caused to miss a loop while the others are rising and falling and are forming loops. In practice the weft-threads lie close together in the fabric. It should be understood, however, that a machine of this kind is not restricted to any particular pattern of cloth, as such pattern is simply a question of the particular arrangement of the cams and needles. The machine can therefore be employed for producing all the ordinary patterns that have been usually produced on the so-called "knitting-looms;" but in addition it can also be employed for producing diagonals as alluded to.

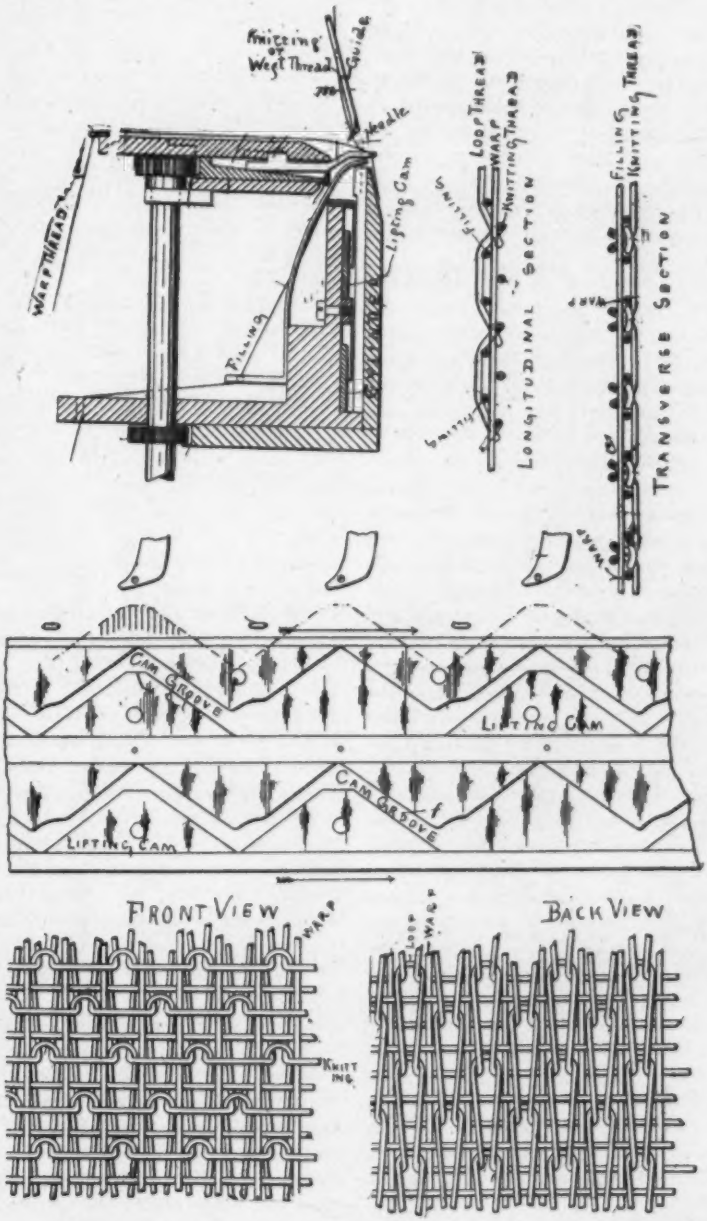
We illustrate the construction of that part of the machine in which the knitting is actually effected, and also the development of one portion of the cylinder, which carries the cams for operating the needles. We also give samples of the fabric, considerably enlarged—the front and the back; also, longitudinal and transverse sections of the same.

The class of fabrics to which the invention more particularly has reference is that having longitudinal or warp threads and transverse or weft threads, the latter being divided into two sets, termed, respectively, "plain weft or filling threads" and "knitted or looped weft-threads."

Referring to the mechanism, an important point consists in so constructing it as to cause the loops of the knitting-thread to miss or skip certain of the warp threads, so that, for example, if a diagonal cloth be required, the loops in one row are produced between alternate warp-threads, while those in the next row are produced between intervening threads.

Another important feature consists in constructing the machine somewhat after the manner of a circular knitting machine, and in such a way that both sets of weft-threads remain stationary and only the warp threads revolve. A convenient means for obtaining the desired distribution of the loops is to provide the needles with

butts of different sizes and to arrange certain of the cams for operating the needles so as to miss the shorter



butts, and thus produce the variation in stitch.

The knitting mechanism proper comprises a needle cylinder arranged to revolve within a stationary cam cylinder. The needles are of the ordinary latched kind, and are carried in tricks or grooves in the usual way. They are secured in their holders by means of solder, or otherwise, and their lower ends are each bent to

form a heald, which goes into a corresponding recess in the holder. The cams which raise the needles into their highest position are termed "lifting-cams." There are also cams which move the needles downward after they have been raised by the lifting-cams. Both kinds of cams consist of interchangeable, triangular blocks, secured to the cam cylinder by screws, and are so arranged that a cam groove, or path, is formed between them for the butts of the needles to enter.

The revolution of the needle-cylinder carries the needles past the cams in the direction of the arrow, with the result that while the thick lifting-cams act on both the wide and the narrow butts, the thin cams only act on the wide butts.

To prevent the warp-threads becoming entangled, they are passed through notches in the edge of a loose ring or band, which is connected with a ring by light metal strips or otherwise, so as to revolve therewith.

The warp-guides are arranged approximately at right angles to the needles in radial tricks or grooves in a revolving flat ring, situated above the cam-cylinder. The guides are provided with butts, which project into a cam-groove on the under side of the cover-plate, so that as they travel around they are moved longitudinally in and out by the cam-groove. At the same time they receive a rising-and-falling motion, which is due to an inclined portion on each guide working in and out of the tricks or grooves, the mouths of which latter are partially closed by a circular band or strip, secured inside a ring. The purpose of the rising movement of the warp-guides is to enable their points to clear the tops of the filling-guides as they travel around, whereas the purpose of the falling movement is to cause the warp-thread to rest solid or direct on the top of the needle-cylinder at the moment the loop is being made. This is an important feature, because if the guide were kept always raised the warp-threads would be inclined when the loops were formed, and consequently the loops would be of different sizes, according to the tension on the thread, and the cloth would have an uneven appearance.

From bobbins the filling-threads are conducted upward by guides and delivered just below the points of the warp-guides. These guides are secured outside the cam-cylinder opposite those places where the needles descend to their lowest positions. The filling-threads are drawn from the guides by the revolution of the needle-cylinder and the warp-threads and are caused to stretch themselves across the outside of these latter threads.

The knitting-threads are delivered onto the opposite side of the warp-threads to that on which the filling-threads are delivered; but by the knitting operation their loops are caused to pass through the fabric and around the filling-threads, so tying the latter in place.

The needles and thread-guides cooperate in the following manner: When the needles rise into their highest position, as indicated in dotted lines, the warp-guides are thrust in between them, and as they revolve the knitting-threads are drawn from the guides and are stretched along the upper sides of the warp-threads below the hooks of the needles, the needle-latches being at this time open. Previously, however, the filling-threads were drawn from their guides along the under sides of the warp-threads, so that as the needles ascended the filling-threads were situated between the backs of the needles and the warp-threads. When, therefore, the needles descend, they draw the knitting-thread down in loops across the filling-threads, so that the latter are firmly locked in position against the warp-threads. A little before the needles descend the warp-guides retire and pass clear of the filling-guides as they travel around with the needles.

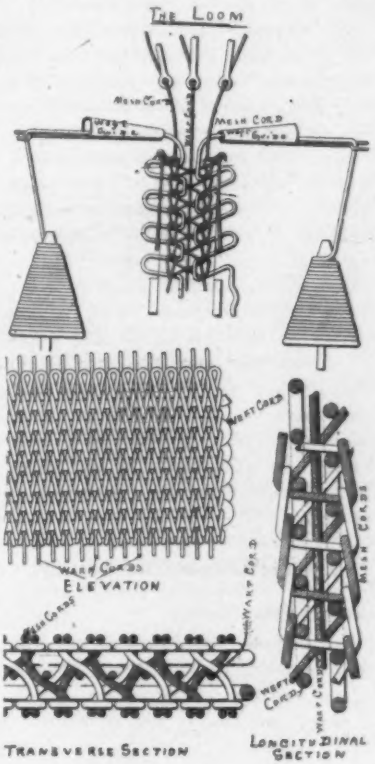
Referring to the fabric, the warp-

threads, as will be seen, run longitudinally. The filling-threads extend transversely across the fabric, and are quite straight. That is to say, they are not bent in and out between the warp-threads, but lay straight across them, on one side thereof, only. In this way these threads serve to prevent the fabric stretching in a transverse direction, just as the warp-threads prevent longitudinal stretching.

The knitted weft-threads are laid on the opposite side of the warp-threads to that on which the filling-threads lie. They alternate with the filling-threads and pass through the fabric from one face to the other, thus serving to tie or knit the other threads together. On the face or front of the fabric, the said threads form loops between alternate pairs of the warp-threads, the legs of the loops lying parallel, or approximately so, with the warp-threads, but on the outer side of the filling-threads, which latter are thus firmly held between the warp-threads and the said legs of the loops. In the fabric shown each loop is of such a length that its legs extend over two filling-threads and engage the corresponding loop in the next knitting-thread but one. It will be seen that the loops in one row break joint with those in the next row, and thus give the diagonal appearance to the fabric. In other words, the loops of the knitting threads follow each other across the fabric in diagonal lines, and thus give a pattern similar to that of an ordinary woven diagonal. Woven diagonals of this kind may have the loops arranged to run either to the right or to the left or may be made up of left-handed work and right-handed work alternating with each other, or checkerwise, as in some woven fabrics. To this end the loops of the knitted weft-threads may be arranged between every third pair of warp-threads or otherwise instead of between alternate pairs of warp-threads, as in the example given.

Knitted Driving Belt.

We furnish illustrations, herewith, of a recently devised knitting driving belt, as the invention of a German, the object of which is to produce a belt having layers of meshes on both sides thereof connected with each other, weft-cords inclosed by the meshes extending across the belt and emerging from the latter only at the edges in the form of loops, and a series of longitudinally-extending warp-cords passing through the belt



from end to end and inclosed by the weft-cords.

We give a perspective view of a portion of the loom employed in the manufacture of this belt, also a longitudinal section of the complete belt, a transverse section, and an elevation.

This belt is made up of the straight longitudinally-extending warp-cords,

mesh-cords and weft-cords, extending across the belt. In the loom, partially illustrated, are to be seen one or several thread-guides placing their cords alternately on two rows of needles, and after the completion of one or several rows of meshes the weft-guides carry the weft-cords to both sides of the warp-cord system, located between the rows of needles. The mesh-cords are thereby passed around the needles, and thus are formed the meshes on the front face of the belt, and alternately the meshes at the back of the belt are interlaced.

A belt constructed as described has the advantage of being provided on both sides with protecting-meshes. The mesh-layers on both sides are formed by the mesh-cords being interlaced, so that the meshes are located at the same height. The warp-cords run straight through the whole length of the belt and are inclosed by the weft-cords, which latter are inclosed by the surface meshes.

The weft-cords only come to the surface of the belt at the edges and are across the whole breadth of the belt inclosed by the mesh-cords running from one flat side to the other, and vice versa, the weft-cords protecting the mesh-cords at the edges, thereby preventing the destruction of the belt.

Automatic Circulars for Hosiery.

Editor Textile World:

In one of the late issues of the principal publication in England devoted to the knitting industry, an article appeared relating to the principle of plain automatic circulars for plain hose and half-hose, etc. Certain statements were made therein, which are apparently erroneous, to which we desire to allude.

One of the statements made is that all the machines of this character have descended from the Shaw principle, and that it was not until the Shaw patent had run out that the others came into the field. In reply to this, we would like to call attention to the fact that before Shaw built a machine on which he had made a single stocking, a number of machines were in the market in the United States. Those that we now recall are the Branson, Bickford, American, Aiken and Nelson.

It is also stated, in reference to how the top is put on, that in some cases the cup transfer is used, the tops being put on the cup by hand, and then transferred from the points on to the needles. In those machines where there are two needle cylinders, it is run on the needles by hand. We think there is a wrong impression here. In the method of putting the tops on to the cups, the loops are put on to the points of the cup by hand. In transferring the needles of the extra cylinder, they are also put on by hand, but they are put where they are ready for the operation of knitting. In the former method, after the loops are put on the points, there is still another hand operation, transferring the loops to the needles of the cylinder.

It is further stated that the greatest difference between all machines lies in how the raising of the separate needles out of action is done. It is also alleged that the motion is effected by a system of moving cams in the cam cylinder, and as the needle moves the cam, the cam picker carries with it the needle out of knitting position; and that each machine in this system has this principle, only in different forms, so as to miss each other's patents. It is further claimed that this is effected by another principle, embracing a system of pickers, one of these acting as a needle lifter, while the other acts as a needle depressor. This is alluded to as the latest method. Some of these statements are rather broader than any man is entitled to make, off-hand. As a matter of fact, some of the American machine builders refute what is here alleged. Many of the American machines raise and lower the needle in exactly the same way, and there is apparently no good reason why there should be a separation. There is an

American 3/4 automatic machine which combines the lifter and dropper, and operates by the same lever in both raising and lowering the needles, because of having the raising picker located on one side of the same lever on which the lower picker is on the opposite side, and this lever has its position changed, in order to change it from a raising to a lowering device.

The English writer states that in all the automatics the quality is changed by automatically raising or lowering the needle cylinder. In criticism of this, we would like to say that the quality is not changed at all by the raising or lowering of the needle cylinder, and that this operation has no other effect, except to make the stitch longer or shorter.

It is said that the 3/4 automatics consist of a plain machine with a ribbed machine added. This is not so.

X.

Philippine Textile Fibres.

By far the most important of the fibre plants growing in the Philippines is Manila hemp or abaca. At first sight this plant might be taken for an ordinary plantain or banana tree, but its fruit is much smaller than the banana, and is not edible.

The Manila hemp crop comes chiefly from the provinces of Albay and Camarines on the island of Luzon, and from the islands of Marinduque, Leyte, Cebu, Mindoro, Samar, Mindanao, and the southern part of Negros.

The finest quality of the fibre is called lupis or quilot, and is of a pearly lustre. Other grades are distinguished by their color and consistency.

Nearly the entire crop is marketed abroad. The average yearly shipments amount to nearly 100,000 long tons and form the most important item in the Philippine export trade.

The United Kingdom and the United States receive the largest shipments, although considerable quantities are also sent to Spain, Australasia, China and Japan.

Cotton occupies a peculiar position in the Philippines. It was the first raw fibre used locally in the manufacture of textile fabrics, but it has recently lost much of its former importance, partly because of the excessive taxation that has for some time been imposed on the textile industry of the islands, but principally because of the competition of British fabrics.

The cotton plants cultivated in the Philippines are chiefly of the herbaceous varieties. They yield a fine white staple, of superior quality and strength. One variety, however, known under the name of cayote, produces a cinnamon-colored fibre. There is also a species called bubuy, that grows like a shrub. The fibre it produces can not be employed in weaving, but is used for stuffing mattresses, pillows, cushions, etc.

Another textile plant that occurs is the amiray. This plant is found only on the Batanes Islands north of Luzon. It closely resembles ramie and yields a fine white fibre of great tensile strength.

Various other fibre plants are found in the Philippines, such as the pita (a kind of aloe), the balibago, the dalanot, or tree-nettle, the pineapple, and the cabonegro (a species of palm tree), as well as many other varieties more or less unknown outside of the archipelago.

—A nation is fatally weak, in time of war, which does not possess within itself all the essentials for clothing its own armies.

—Among all the industries in New England, the wool manufacture is second in importance to none save only the cotton manufacture, and it is not many millions behind that. It far exceeds the boot and shoe industry, not only of New England, but of the whole country, and the iron and steel industries of that section.

SILK DEPARTMENT.

Notes on Silk Weaving.

LOOM FIXING—WEAVERS—SPEED OF LOOMS.

A loom requires a certain amount of attention, repairs, and renewal of certain parts, for which purpose men are employed, who are termed "loom fixers" and in some mills, where there is no machinist or carpenter employed, the fixer ought to be a handy man at this work, as well as a thorough weaver. The number of looms a fixer can attend to depends on the kind of looms used and fabrics being made. A loom fixer could attend to 60 looms comfortably for a number of years successfully, if on one fabric only, or with only slight changes; but in mills where continual changes in fabrics are being made, a less number is desirable. As an illustration, suppose a mill of 250 looms, having five fixers, desiring economy, reduce the number to four, thus saving $17 per week. It does not follow that a saving will occur thereby though the books show in the twelve months a difference of $900 between Dr. and Cr. There have been twelve more looms added to each fixer, a small number in themselves, but require some extra work taken in connection with the 48 the fixer already had; and, unless each fixer is a thoroughly competent person, the adding of those looms to his charge will be the cause of a loss of production of cloth throughout his whole section, and throughout the whole mill, which will easily, with poorer quality of work, counterbalance the money saved, and also cause a discontented feeling throughout the whole mill, and be the cause of losing a large number of good weavers.

Another point is, if a loom fixer is competent to run a section of looms, and has considerable spare time to walk or sit around, the proprietor can be assured that his interest is not suffering; and to add to his work more looms on that account is a mistaken policy.

A loom fixer's duty is to keep the looms in running order, and in some mills provide weavers.

The loom fixers having obtained the warp with harnesses and reed attached thereto, places the warp in the loom, and draws the harnesses forward, hanging them loosely in their place, then putting a light weight on the beam by means of weight rope and weights. If an old harness has been used, the lap end of the old warp, to which the new warp has been twisted, is passed around the roller and tightened; but if a new harness, the warp is taken in parts and knotted, then looped cords are secured to roller, and a rod inserted at the opposite end, to which the warp is tied. These cords are termed "spancords" and for heavy work are satisfactorily replaced with "aprons" made from canvas. The loom is turned to position and the harness attached and leveled to shedding mechanism.

After a little manoeuvering so as to get the harnesses in desired position the lease cords are laced with rods, a few picks of filling inserted, the warp properly weighed, and the desired pinion wheel put in place. The loom is then started.

It would take a special book to deal with the art of loom fixing in details, and the management thereto which is the duty of a loom fixer; only long practical experience can teach their proper performance, though a great advantage can be gained by having a reference therefor.

The wages paid to loom fixers vary;

a dollar or two paid extra with a little consideration for human nature is never thrown away.

Weavers engaged in broad silk differ from those engaged in other industries, and ought to be prepared to run any make of loom and any shedding mechanism to be insured steady work, except in isolated cases. The wages paid are invariably for piece work, though exceptions have been made in mills where the weavers receive a weekly salary, but depending on the amount of work produced for their positions; but the piece system is the best.

The duties of a weaver are monotonous and require some little skill in operating the more intricate looms; but in plain weaving little skill is required, the work consisting of piecing up broken ends of warp and drawing them into their places through the harness and reed, filling of shuttles with new quills and placing them in the loom as required, putting in headings, taking off cloth, oiling loom, etc.

The number of looms a weaver can run has never been more than two, and on fancy fabrics one loom is considered sufficient. It is certainly a mistaken policy for a weaver of twenty years' experience to refuse to run more than one or even two looms, if his or her ability enables it to be done, as by doing so they resist the advantages and wage-earning power their long experience has given them.

If a manufacturer can afford to pay ten cents a yard for a fabric being woven, and has figured on one loom to each weaver, and then finds weavers of long experience who can with equal success operate two looms, a discrimination ought not to be made against these weavers.

The waste in this department is of great importance in some mills, as much as fifteen per cent. being allowed; but this is far too much.

The speed at which silk looms are run, varies from 90 to 160 picks per minute. A nice running speed is about 120 picks, but if on a heavy count or pattern, 100 is a better speed for satisfactory work. This is a case of "the race i not always to the swift." On ordinary goods the time lost for piecing warp threads and handling the shuttle ought not to be greater than seven per cent., with the present state of the art of weaving. The lost time in the most intricate machinery ought not to be more than 15 per cent.

A fair day's work for a loom run at the rate of 120 picks, 80 picks to the inch, and weaving 20,000 four thread, 20 inches wide, is about 20 yards per day. The reed space of a loom is the distance between the sword arms on the line of lay, allowing about two inches for clear. A reed space of 32 inches will weave comfortably a cloth of 30 inches.

JOHN.

The Silk Cocoon.

Silk cocoons are collected the seventh day after the worms have climbed the briar twigs. In order to be certain that they have finished their work and have undergone the transformation into chrysalids, a few cocoons are taken up in the hand and shaken. If a shock is felt, the chrysalids are formed and the branches are removed. The following day the loose silk is taken from the cocoons, an operation styled in France as "debavage." The cocoons are then ready for market.

The maximum amount of cocoons which 1 ounce of grain, comprising 35,000 worms, furnishes, is 130 pounds, but a return of 80 pounds is considered very satisfactory. From 625 to 1100 cocoons are required to make 1 pound of silk, and the price of a pound of cocoons in southern France is 34 cents. The total amount of cocoons produced annually in France is about 20,000,000 pounds.

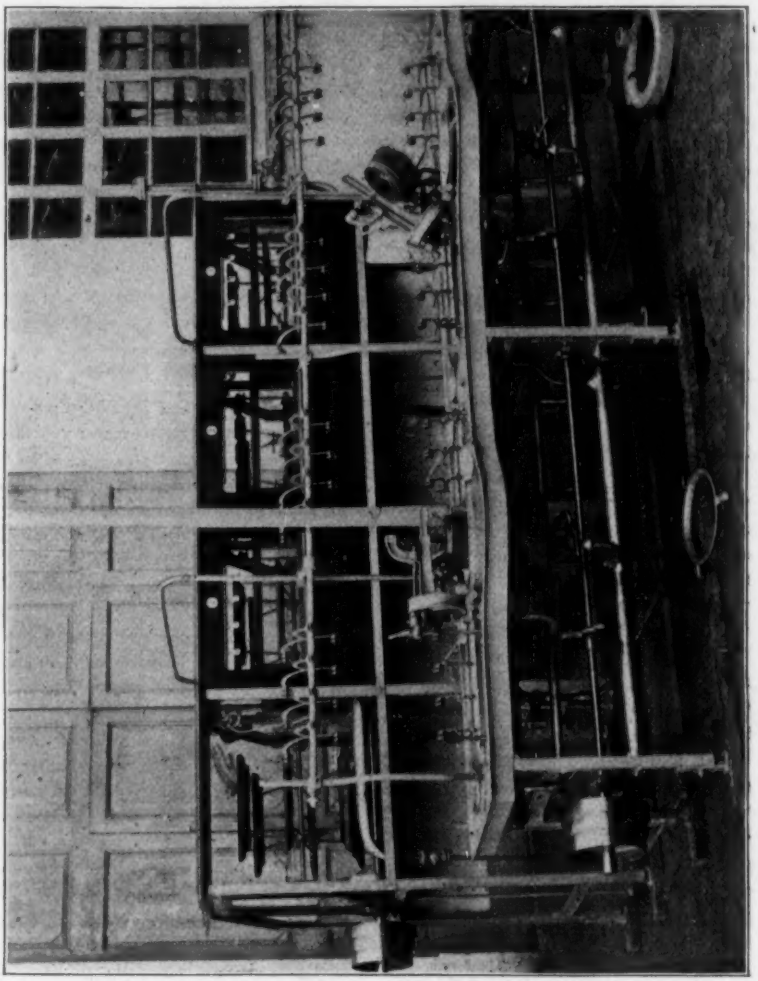
—Attempts have been made to utilize in textile manufacture the silk spun by the spider, but have met with little success, the fibre lacking the requisite strength.

Silk Reeling in Italy.

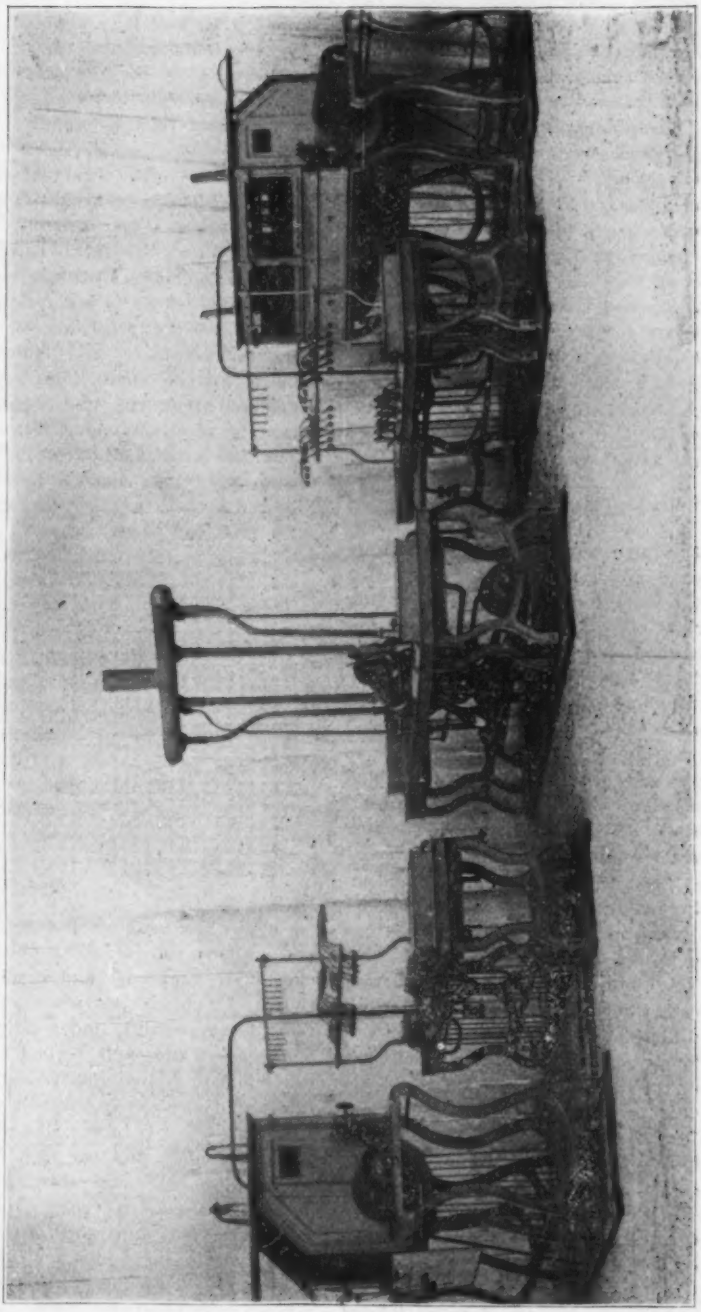
In Italy there are manufacturers of silk reeling machines, all having more or less the same fundamental basis, but it is the general opinion of manufacturers of silk goods in Italy that the best machines are manufactured by Giovani Battaglia, at Luino. Illustrations of the machines from this firm are given herewith. The price of the one marked A is 250 francs ($48.25) per basin, and the one marked B 450 francs ($86.85) per basin. Formerly, the benches supporting the basins were of wood, but now they are almost entirely of cast iron, having a form and disposition according to the taste and convenience of the spinners. The reels for winding the silk threads are placed in boxes heated by steam tubes, the boxes in question being made of cast iron.

In the past few years, a number of experiments for reeling silk have been made. Formerly, it was only possible to reel from three to four threads at a time, but now as many as eight threads can be reeled, each thread requiring a reel for itself.

It is estimated that an operator of the first-named machine, A, will reel



"B."



"A."

about one-half kilogram (1.1 pounds) of silk in a day of eleven hours, and of the second about four-fifths of a kilogram (1.8 pounds). This would depend largely, however, upon the quality of the silk reeled and the number of threads reeled at a time, and these estimates are based upon the best cocoons.

In regard to the cost of reeling, this would depend almost entirely upon the wages paid the operators and the cost of fuel. In Italy, the price paid this class of labor will average about 30 cents per day.

A mill with 200 to 300 basins is considered a large establishment in Europe, but there are a number of the new mills in China which have as many as 800 basins.

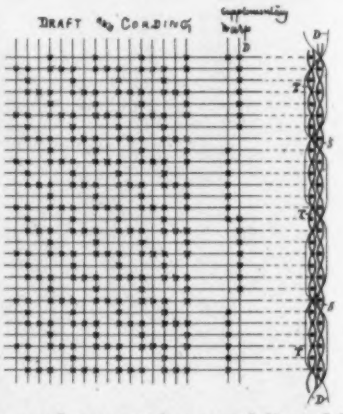
An Improved Silk Fabric.

An improvement in the manufacture of silk fabrics has recently been made by a resident of Lyons, having for its object a fabric of a novel appearance characterized by a uniform velvety effect extending over a brilliant foundation, which some kinds of moires—such as "mirror," "French," or "antique" moires—may approach as regards appearance, but from which this article differs entirely by the total absence of the "watered" effect which these various kinds of moires present and also by the doubling or folding being dispensed with, as the method of manufacture here shown enables one to avoid such.

This improved fabric differs from those hitherto made, by the following characteristic points: (a) It has a velvety appearance uniformly distributed over the brilliant foundation of the article. (b) It has the touch or feel peculiar to moires or calendered fabrics —that is to say, those which have undergone a moireing pressure—and it has especially the feel and surface of "velvet moire." (c) It has a glazed back, resulting from the compression produced by the moire operation, which back exists in all moire fabrics with the exception, of course, of double-faced moires. (d) It has especially the peculiar appearance of a fine hand made velvet, and it reproduces faithfully the reflection and the deep appearance yielded by the play of the folds of such fabric, its resemblance to which as regards appearance is striking.

The whole effect heinbefore described has long been sought either by manufacturers in the different methods of producing the fabric capable of receiving the moire operation without the watered effect or by calenderers (moirers) in the processes of treatment for obtaining this moire, but without anyone succeeding, so it is considered that the effect here obtained is absolutely novel.

The improved method of manufacturing the fabric consists in placing



on one loom a main warp delivered by one or more rollers and combined according to the draft and cording as shown, for producing simultaneously two pieces perfectly independent one of the other and each worked by half the common warp and leased separately and alternately by their respective wefts—that is to say, one pick for the upper piece and one pick for the under piece—so as to form two exactly-superposed and regularly-adhering pieces. This adherence is obtained by a distinct supplementary warp, as shown, placed on one or more rollers which supplementary warp is common to the two fabrics S and T, leas-

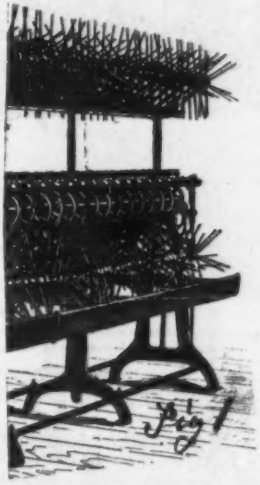
ing the whole with more or less open-work, and passes alternately from the lay of the back or reverse of the lower piece S to the lay of the back of the upper piece T, as shown by the line D, which shows the binding produced by the said supplementary warp. The number of threads of this warp D may vary and be distributed in any suitable manner and they may be more or less close together over the width of the fabric. As may easily be understood, this supplementary warp D has only for its object to maintain the rib of one piece rigidly in the furrow of the other, according to the order of the alternate picks of the lay, there being one pick to one and one pick to the other of the two pieces, and it is the rigorous and absolute maintenance of this order up to and during the calendering (moireing) which, while allowing of the mathematically-rectilinear fitting in of the picks of weft of each of the two pieces of material, will avoid the watered effects produced, as is well known, by the hitherto inevitable derangements of the ribs under the pressure of calendering, (moireing). This supplementary warp D, must be removed after the calendering (moireing) process in order to allow of the separation of the two pieces S and T. This removal may be effected by any suitable means, either by hand or mechanically.

The novel effect which has been sought and obtained, is, however, really only produced by the use of, first, a warp consisting of threads of thrown silk scoured and worked into single, double, triple, or the like threads, and, second, a weft consisting of a thread composed of several threads of the same nature united in a single twist—such as wool, silk, cotton, or spun floss-silk—the said thread being made as round and compact as possible, as the round form enables a ribbed surface to be obtained in the fabric of such regularity as to allow of the ribs being prevented meeting, it being necessary that the said ribs be maintained exactly superposed alternately—that is to say, the ribs of each piece in the furrows of the other—in order to carry into effect the process of manufacture. This form of weft, in combination with the process of manufacture, alone admits of the effect indicated being obtained.

The fundamental or, rather, experimental draft and cording only is shown here. It is also possible to add the arrangement known as "stripes," "checks," "embossed," "printed," and the like.

Silk Throwing.

Silk throwing is the spinning and doubling of silk. Nature supplys the silk threads in cocoons containing some twelve hundred yards in length of filature, i. e., single thread of silk, several threads being wound together, as the silk is reeled from the cocoons.



Formerly the conditioning of silk was done by the throwster, but now this is done as a separate branch of the business.

Of the four leading materials for fabrics, viz., cotton, wool, flax and silk, silk is the only fibre that can be formed into warp or weft, direct from its source of supply.

The silk for regular manufacture is wound from the imported skeins onto bobbins, preferably of metal, which

process is termed "hard silk winding," and for which female help is employed.

The bobbins containing the silk are placed upon rapidly driven spindles, and rewound upon similar bobbins, producing what is termed "dumb singles," the number of twists per inch put in depending on the intended purposes of the silk; if for tram (weft) a very slight twist would be made, reverse for organzine (warp).

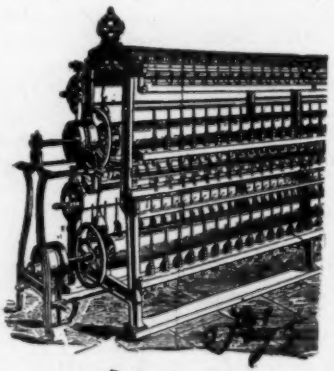


Fig. 2

The process of cleaning the silk is obtained by guiding the silk in its traverse from one bobbin to another, with a metal guide, in which is a slit

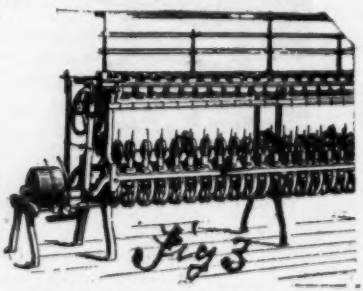


Fig 3

in which the silk runs. When there are any large knots, or other imperfections which the slit refuses to let pass, the lever, in which the slit is cut, rises, or should do so, and lifts the winding bobbin from out of engagement with its driving mechanism.

When the twisting and doubling of the silk has attained the desired condition, the silk is rereeled into skeins ready for the dyer. The machinery used in the business of "Silk Throwing" does not differ much from what was used some years since, except in its spinning or productive capacity.

Fig. 1 shows a double equipped winding frame.

Fig. 2 shows a double decker spinning frame.

Fig. 3 shows a single decker spinning frame, in which the spindles are driven by separate friction.

Parts of machinery not shown are similar to the parts shown.

CAMBELL.

Raw Silk and Its Imports.

George L. Montgomery made a very interesting report of raw silk, at the late annual meeting of the Silk Association of America, from which we make the following abstracts:

"The passing silk season has been marked by an apparent disregard by our silk trade of the actual position of silk. A year ago it was evident that the world's supply of silk would not be in excess of actual requirements, if consumption continued on the same scale, and leave the world's visible stocks with the opening of the season 1898-1899 as an exceptionally small one.

"Shipments of silks to the U. S. as compiled by the silk association show

1897-1898,	from all countries,	70,142	bales.
1896-1897,	" "	44,895	"
1895-1896,	" "	55,661	"
1894-1895,	" "	55,465	"
1893-1894,	" "	34,815	"
1892-1893,	" "	52,088	"
1891-1892,	" "	52,371	"
1890-1891,	" "	34,667	"

or an average for eight years of 49,938 bales. With the largest export ever known to this country in 1897-1898, followed this season by an export of probably about 60,000 bales, and stocks, so far as can be seen, at a very low point, shows the rapid strides of the manufacturing industry in this country within the past few years. The president of the Silk Association of Milan, at a general meeting held at Milan on Jan. 31st, 1899, made the statement, that the world's visible stocks of raw silk had dimin-

ished from 3,326,000 kilos on Dec, 31st, 1893 to 1,664,000 kilos on Dec. 31st, 1898, while the European Silk Conditioning Works had handled: 17,179,000 kilos in 1893 against 22,100,000 kilos in 1898.

"Without expressing any opinion as to the immediate future of the market, consideration should be given to the point that even with good crops at all points, the bare consuming markets will need replenishing, and, that, with the consumption on its present scale, would absorb a large yield, so that without some unlooked for and important political complication, it would seem as if our manufacturing industry must adapt themselves to a higher level of prices than has been current for the past few years."

The Silkworm.

The term "education" comprises all the care bestowed on the silkworms from the moment they are hatched to the completion of the cocoons. The life of the insect is divided into five periods or ages, of five or six days' duration for the first three or four, while the fifth is from ten to eleven days, each period being marked by a moult. Six light repasts are given each day during the first two periods, the first in the early morning, and the last late at night, while four abundant meals are considered sufficient for the two following periods, increased to six in the fifth period. The French cultivators believe that the number of repasts is important for the quality of the silk.

About 1600 pounds of leaves are necessary for 35,000 silkworms produced from 1 ounce of grain. The "education" lasts from twenty-eight to thirty-two days, but many silkworm raisers cut this period short two or three days, by maintaining an increased temperature of between 68 and 77° F. The person intrusted with the care of the worms is obliged to remain in the room night and day, so great is the degree of impressionability of the insect. A storm, a gust of wind, a sudden lowering of the temperature, a repast given with dew-damped leaves, or some other apparently trifling accident would be sufficient to destroy in one moment the most brilliant expectations.

In order to prevent overcrowding by the worms, the custom is to lay on them sheets of clean paper perforated with a series of holes corresponding to the size of the insects, the food being placed on top of the paper. The worms pass through the holes and climb up on the leaves. When a sufficient number is collected in this way, the paper is removed to one of the vacant shelves. The same operation is begun again and repeated, until all the worms have been removed from the place they first occupied, when the shelves are cleaned of the debris. This latter operation is also repeated after each moulting period.

About the sixth day of the fifth or last period, the attendant commences to line the spaces between the shelves with twigs of briar, broom, or oak, placing them in an upright position at a distance of about a foot apart, and disposed in the form of an arch or a vine trellis. On the ninth day, the silkworms climb up these branches in large numbers and choose a place for spinning their cocoons, which they complete in four days.

Robert W. Hare.

At the regular July meeting of the sewing silk and twist manufacturers of America, held at the Silk Exchange Building, New York City, resolutions were passed relating to the death of Robert W. Hare, of Chicago, manager of the Nonotuck Silk Company at that place, for the last twenty years. Mr. Hare was, during the greater part of his business career, connected with the silk industry of this country, in which he was regarded with the highest respect and esteem for both his sterling integrity and excellent business abilities, which won for him a leading position in his chosen calling.

POWER DEPARTMENT.

ELECTRICITY—STEAM—WATER.

The Blower System.

HEATING, VENTILATING AND MOISTENING TEXTILE MILLS.

In no class of manufacturing buildings has the adaptability of the blower system of heating and ventilation, been more carefully considered than in the textile mills; and yet this is but natural when the perfection of all appointments in such structures is considered. The general similarity of construction in buildings of this character has greatly facilitated the standardizing of details in connection with the heating, ventilating and moistening system.

Modern mill construction, as exemplified in the textile mill, is generally considered to be evidenced in brick walls, numerous and large windows, wooden floor framing consisting of

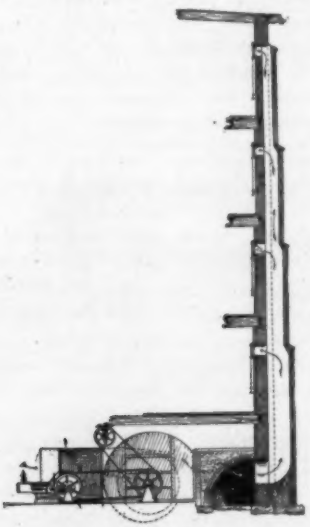


FIG. 1.

large timbers extending across the mill at intervals of about 10 feet, supported by the walls and by wooden columns, the floor being of 3 or 4-inch plank with 1-inch top finish. Such construction is simplicity itself.

The uniform size and arrangement of the machines within such a building naturally compels the preservation of straight and ample passageways

FIG. 2.

between the individual machines, as well as around them next to the walls. Evidently there is no practical opportunity for the introduction of heating flues anywhere within the building, because of their serious interference with such uniformity. But the brick walls present a most convenient location for flues of the requisite area.

In one of the forms adopted, such flues, projecting outward from the building, are placed along one side of the structure only, and at intervals of 40 to 70 feet, according to the character and construction of the building. In the basement, or ground floor, nearly midway of its length, is located the apparatus, usually of the type known as the three-pulley rig, so ar-

ranged that the fans may be driven by the mill engine during the day, and, if necessary, during the night by the special fan engine provided for the purpose.

Extending along the floor upon which the apparatus stands, or beneath it, if desired, is a brick duct formed upon one side by the wall of the building itself. This duct, in its most approved type, forms in section what is known as a quadrant arch, as shown in Fig. 1. Connection from this duct is made with each pilaster flue, the duct being gradually reduced in area as air is thus discharged from it.

The flue, as will be noted, is also decreased as it extends upward, to compensate for the air delivered to the various floors. Its general construction must be evident in Fig. 1. At a sufficient distance below the floor beams, to avoid weakening the construction, outlets are provided from this flue into each of the floors.

Each opening, in turn, is fitted with a special damper of the type presented in Fig. 2. This consists of a cast-iron frame bricked into the wall, and sufficiently strong to prevent weakening the same. Pivoted at the top of this frame, and swinging inward, is a sheet-iron plate, serving the double purpose of damper and deflector, and adjustable by a worm on the end of the vertical rod acting upon a gear upon the damper axis to move it to any desired position. The rod extends down to within easy reach of the operative.

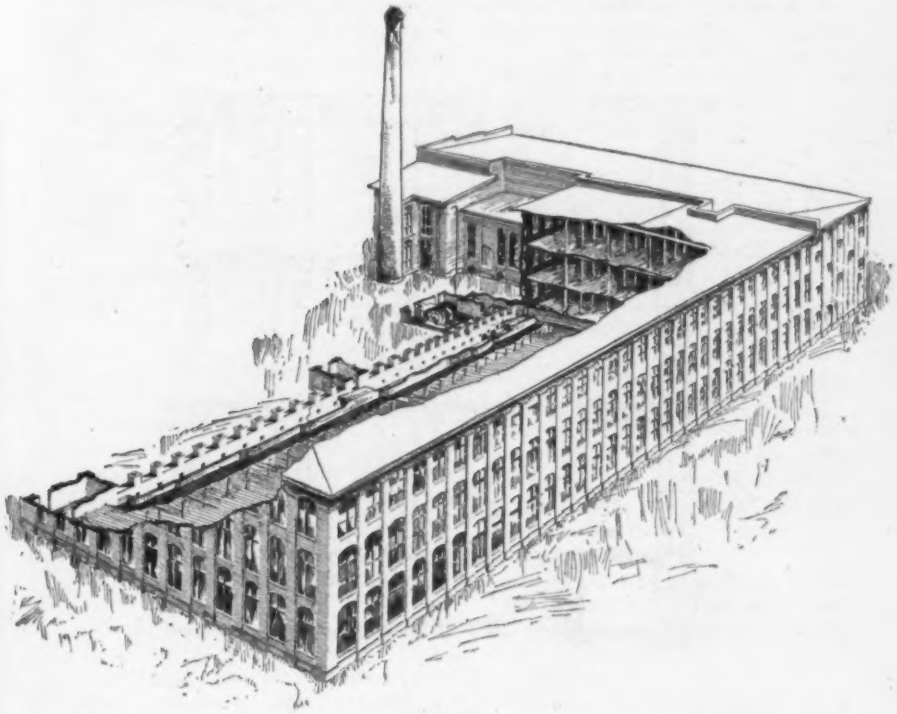


FIG. 3.

Evidently the result of such an arrangement of the blower system in connection with a building of the character described, is to provide the most excellent opportunity for successful heating from one side of the building only. The smooth ceilings, without beams to interfere with the movement of air directly across the building, make it possible to fully sup-

ply the side farthest from the flues, while the moving pulleys, belting and shafting which intervene, fortunately present just enough opposition to sufficiently break up these air currents and thoroughly mix the air throughout the room. Although conditions permitting, it is usually advisable to place the flues upon the least exposed side of the building and discharge the air toward the colder side, nevertheless, in practice, the effect of location of flues is seldom perceptible in such a structure.

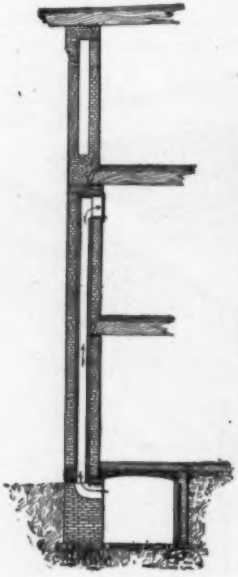


FIG. 4.

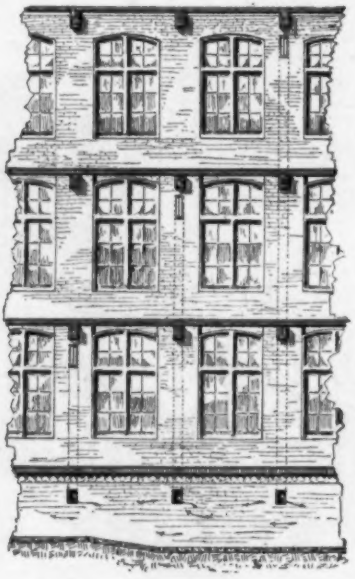


FIG. 5.

In the arrangement just described, each individual flue supplies heated air to each of the floors of the building. A somewhat different arrangement is presented in Figs. 3, 4 and 5. In this building, which was designed distinctively as a yarn mill, no projecting pilaster flues were introduced, but each pier between the windows along one side of the building was provided with an internal rectangular tile lining serving as a flue, and as indicated in Fig. 4. Each individual flue supplies air to only a single floor, so that, there being three floors, every third flue supplies the same floor. As the piers are located 10 feet apart, this brings the openings on each floor 30 feet apart, making them even more numerous than with the ordinary pilaster arrangement. Evidently in a building of four stories the openings would, under similar conditions, be 40 feet apart. Each flue opening is fitted with a special form of damper somewhat different in construction from that already shown in Fig. 2.

This arrangement of flues avoids the break in architectural harmony resulting from the introduction of the pilaster flues, but at the expense of greater multiplicity in flues and openings and in greater opportunity for loss of heat, which is, however, materially reduced by the use of the flue linings. Each flue connects at its base with the main horizontal duct, of which the building wall forms one side. The top, which is arched in form, is constructed of corrugated sheet iron, covered level with cement. Such an arrangement is both strong and serviceable, and is to be preferred substantially in this form wherever the duct has to be excavated. Another scheme of top covering consists in lay-

ing brick upon tee irons extending at proper intervals across the top of the duct. As is evident in Fig. 5, reduction in area as the duct progresses is in part secured by raising the level of its bottom, which, in consideration of the cost of excavation, is more economical than lowering the top. Under all conditions the duct should be kept as nearly square in cross section as the circumstances will permit, thereby saving material and reducing the superficial area and the losses by friction of moving air, which would be incurred by any other form. Moistening is readily accomplished by a proper device placed within the hot air current in the duct.

The apparatus, which is located about midway of the length of the mill, is of the duplex type, each fan being driven by its individual engine and the entire apparatus being located in an independent building. The absence of a basement under the mill is a sufficient explanation for this location. The underground ducts from the two fans unite before they pass beneath the mill wall and are here provided with a swinging damper, so arranged as to automatically regulate the pressure and volume of air discharged from each fan, and to further close immediately the duct from either fan in case it is shut down. This apparatus was built and installed by the B. F. Sturtevant Co., Boston, Mass., from whose elaborate Treatise on Ventilation and Heating the preceding descriptions and illustrations have been taken.

The duct extending from the apparatus toward the extreme right-hand end of the mill, as presented in the illustration, supplies the picker house, which is there located, and which, owing to the character of the process carried on within it, requires an exceptionally large volume of air for the double purpose of maintaining the temperature and making good the amount withdrawn by the picker fans.

—Of the 1,693 mills in operation in 1890, New England possessed 518.

Practical Electricity.

ALTON D. ADAMS.

COPPER AND CARBON BRUSHES.

For a number of years after dynamos and electric motors came into common use, brushes made up of thin copper strips or wires were employed to conduct the current to and from the commutator.

Metallic brushes were also used on the first street-car motors, and it has been said in case of one pioneer line, that a trail of finely divided brass and copper from the commutator and brushes marked the entire length of track.

The rapid destruction of both brushes and commutators soon led to the carbon brush for street-car motors, and they are probably used on every car in the United States at this time.

Among stationary machines carbon brushes were first generally used on motors and dynamos of two hundred and fifty and five hundred volts.

During the last two or three years the use of carbon brushes has generally extended to all new dynamos and electric motors of 110 volts and over, except in the cases of arc and alternating current machines.

This change has come about through a general recognition by manufacturers and users of electrical machinery of the several advantages of the carbon over copper brushes.

The chief advantage to the manufacturer through the use of carbon brushes is that for a given change in position of brushes on the commutator and freedom from sparking with changing loads, the field magnet and windings may be somewhat reduced in weight; but this advantage is nearly offset by the increased size and cost of commutator.

To the user the gain from carbon brushes is marked; the commutator and brushes wear longer, require less attention, and the skill in trimming and setting necessary with the copper brush is no longer called for.

Manufacturers and users alike share

in the benefits from carbon brushes used on motors which must work alternately in both directions, as in elevators and hoisting machines.

While these desirable results are now attained through the use of carbon brushes, the experiences leading up to the present state of the art have often been far from pleasant to either the manufacturer or user.

First attempts to use carbon brushes by many makers of electrical machinery were frequently followed by serious sparking and heating at commutators, loud complaints from users and in some cases the loss of business.

It is now very easy to look back, by the light of experience, and see how most of this trouble might have been avoided, but it was by no means a simple matter for the average electrical engineer, six or seven years ago, to discover why a dynamo or motor which had been sent out of the shop in apparently perfect condition should come back after two or three weeks' run with a commutator surface that felt like a gear wheel, and emit a brilliant arc light effect when operated.

To rightly understand the causes of these early troubles it is necessary to hold in mind that later experience has fully proved, that for the satisfactory operation of carbon brushes the commutator must be as smooth and round as it is practical to make it.

Now it is one thing to make a commutator smooth and round and quite another to have it continue so in operation, especially if carbon brushes are used on it.

A very large part of the early troubles with carbon brushes were due simply to the fact that commutators did not remain true and smooth after they had been for a short time in operation.

Two main causes contributed to "high bars," "low bars," and uneven commutator surfaces; these were weak and loose construction of commutator parts and the extra heat incident to the use of carbon brushes.

The greatest force tending to rack and render uneven a commutator surface is its expansion due to internal heat, and the improvements which, under the use of carbon brushes practically have resulted in lower commutator temperatures and a more rigid mechanical construction.

With a smooth commutator and a given number of amperes passing out and in through the brushes the heat produced at the points of contact between the brushes and commutator depends on the actual area of contact surface between the brushes and commutator and the material of which the brushes are composed.

When copper brushes were in common use current densities of one hundred to one hundred and twenty-five amperes per square inch of contact between brushes and commutator were common, and this density was not decreased below eighty or ninety amperes per square inch in some of the early applications of carbon brushes.

As the use of the carbon brush has extended the ampere densities of contact area have gradually declined until thirty amperes per square inch is considered a satisfactory proportion in many cases at the present time.

When commutators designed to deliver a certain number of amperes, through copper brushes, were fitted with carbon brushes having but slightly increased contact area, a high degree of heat was soon reached which operated, through expansion of the parts, to render the surface of commutator uneven, so that a small arc was formed between the brush and each segment that came into circuit, by the lifting of the brush in a radial line, when the corner of the brush struck the next high bar.

This electric arc, though very short, develops much heat, for it carries the entire current of the machine; heat thus produced increases the temperature of commutator to a still higher degree, with the result that the operation once well under way soon renders the machine inoperative through heating and sparking at the commutator.

Copper brushes, even with an uneven commutator do not have the above positive and increasing tendency to heating and sparking, as the

copper brush, unlike the carbon, is flexible and made of individual elements, so that when one corner or edge of the brush is lifted by a high bar the remainder of the brush remains in contact.

For above reason commutators of weak mechanical construction will operate fairly well for years with copper brushes, but would become inoperative in a few weeks were carbon brushes used.

To insure satisfactory operation with carbor brushes, then, the commutator must have great stiffness in the individual segments, and strength in the clamping parts, the area of brush contact surface must be great enough to maintain a low current density, say thirty amperes per square inch of contact, and the surface of commutator must be as nearly round and smooth as it is practical to make it.

It is often desired to apply carbon brushes to old machines, and in many cases this can be done, as it was at one time common among manufacturers to send out dynamos having commutators of about the same size and ampere capacity on all machines of a given power whether wound for one hundred and twenty-five, two hundred and fifty or five hundred volts.

The above practice gave only one half the current density at brush contacts of two hundred and fifty volt machines and one quarter the density at brush contacts in five hundred volt machines as in those of our hundred and twenty-five volts.

In cases like the last, if the one hundred and twenty-five volt machines had a density of one hundred amperes at brush contacts, the two hundred and fifty volt machines would have density of fifty, and the five hundred volt twenty-five amperes per square inch of brush contacts, which last would easily permit the use of carbon brushes, with a fairly strong commutator.

Another condition which favors the use of carbon brushes on old machines is that the full width of two full segments may be covered by the carbon brush contact, while with copper brushes hardly more than a width of one and one-half segments should usually be covered by the brush contact.

Sprinklers in Storehouses.

In the Boston Manufacturers' Mutual Fire Insurance Company's report for June, President Edward Atkinson says:

"Attention is called to the numerous fires which have occurred in June and to the effectiveness of the service by which they have been extinguished, with a total loss to this company of less than $20,000, diminishing our dividends by only two points. We cannot compute constructive savings; we cannot say what the damage, for instance, in the Globe Yarn Mill would have been except for the two sprinklers, which put out a fire caused by lightning, in which there would have been great delay under any other conditions. Except for the sprinklers the damage could not have failed to have been very heavy, even if the mill had not been destroyed.

"In the case of the cotton house of the Tremont & Suffolk Mills, this cotton house had been constructed with heavy party walls, but the end was unprotected, having in view a further extension. It was boarded up. The large stock of cotton suddenly put in, filling this house, rendered it necessary or expedient to put up a light wooden shed for excess cotton, twenty-five feet distant, in which the fire originated. The speedy destruction of this light wooden covering and the great efficiency of the Lowell fire department and the good work of the mill fire brigade rendered the dispersion of the bales of the burning cotton and the extinguishment of the fire, in detail, comparatively easy work, as will be witnessed by the small amount of the loss and the large salvage. The excessive heat of this fire, at its first outbreak, made it

nearly impossible to approach within a hundred feet of it. The wooden end of the cotton house was twenty-five feet away. The heat passing through the cracks or thin boarding started the sprinklers, which were on a dry pipe system, before the boarding had taken fire in any considerable measure. Mr. Thomas, the agent, reports that he was on the spot within less than five minutes after the private alarm had been given, which preceded the public alarm, when he witnessed the operation of the sprinklers in this cotton house.

"Reference may be made also to the fire in the cotton house of the Dwight Mfg. Co., well managed and well saved, where, in the judgment of the inspectors, little or no loss would have occurred had the sprinklers been in position. Reference may also be made to the considerable loss in the works of the George H. Gilbert Mfg. Co., where sprinklers were under agreement, bringing to a conclusion very heavy expenditures which have been made on these works during the last two years in more important places. Reference may also be made to the very numerous instances of the successful working of sprinklers even in this one month.

"These and other facts will call the attention of all members to the expediency of making immediate contracts for sprinklers in all storehouses. The time to put them in is now, when there is little or no stock in the way. We have called attention to this defect in the safeguards, from time to time, during the last three years; but, considering the large expenditure met by our members in remodeling hydrant systems and in bringing the standard of sprinklers in the factory proper up to one hundred per cent., we have delayed pressing the matter until more favorable business conditions have arrived. The losses on storage are now, in ratio to the losses on protected factories, out of all due proportion. It has been proposed to double the rates on storehouses, pending protection; but that proposal has been deferred, it being thought best to precede it by urgent pressure for full protection, as we did in securing the complete protection of the main mills and works, which took many years. It was not until within the last three years that we began to drop the risks which either could not be suitably protected, or which the owners did not see fit to protect. That is the proposed course on storehouses. We urge every member to act at once. Renewal at present rates or rejection of the risk will depend on conditions at the expiration of the policies in the year 1900, when more positive action may rightly be demanded by those who have protected their storehouses, if any then remain unprotected where sprinklers can rightly be called for."

—The American consul at Batavia has written to the State Department referring to the uncertainty caused among indigo growers in British India, by the development of Synthetic indigo, and if we may judge from a clipping he encloses from the Straits (Singapore) Budget, there is much despondency among the growers and fear that their business is threatened by the synthetically prepared dye. The reports from the different indigo growing districts in India indicate a considerable decline in the acreage under cultivation, last year's figures being the lowest for some years past. The Java indigo business shows, however, no falling off, but, on the contrary, an increase in 1897 over previous years. Very little of this, however, goes to Great Britain or the United States, three quarters of the exports of indigo from Java being sent to Holland. It is a matter of interest to learn that in Singapore, where a good deal of dyeing is done by Chinese firms, that synthetic product has been used experimentally with satisfaction.

—Simplicity in weave design runs parallel with ingenious color compounds.

DYEING DEPARTMENT.

Dye Recipes for August.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $3.

RECIPE NO. 113.

Violet on Cotton Yarn.

Diazyl Garnet on 100 lbs. of cotton yarn.

Prepare the dye bath with

3 lbs. Diazyl Garnet.
(C. Bischoff & Co., 87 Park Place, New York.)
1 lb. Alum.
3 lbs. Glauber's Salt.

Enter yarn at 180° F., bring to boil and dye at this temperature for one hour.

(This color was used in recipe 15, January, 1899, in connection with common salt and soda).

RECIPE NO. 114.

Black on Cotton Yarn.

Carbide Black R I on 100 lbs. of cotton yarn.

Prepare bath with

25 lbs. Common Salt.
10 lbs. Carbide Black R I.
(A. Klipstein & Co., 122 Pearl St., New York.)

Commence the dyeing at 100° F., bring to boil, and boil one hour, constantly working the yarn.

It is then advisable to give the yarn an after treatment in a bath made up with

3 lbs. Potassium Bichromate.
1 lb. Copper Sulphate.

Work in this bath for ½ hour at a boiling temperature.

This after treatment renders the color faster to light and washing.

The bath should be used for a second dyeing if possible, as much less dyestuff is then required.

Carbide Black R I penetrates the fibre well, and dyes evenly. It might be found valuable in dyeing a chain warp, since the dye bath could then be economically charged with a heavy percentage of the dyestuff.

RECIPE NO. 115.

Brown on Cotton Yarn.

Compound shade on 100 lbs. of cotton yarn.

Prepare dye bath with

5 lbs. Common Salt.
5 lbs. Sal Soda.

Then dissolve and add

2 lbs. Thiocatechine No. 1.
3 lbs. Cachou de Laval.
(Sykes & Street, 85 Water St., New York.)

Enter the yarn at a boil and dye at this temperature for one hour.

Then fix for about 20 minutes at 140° F. in bath made up with

2½ lbs. Copper Sulphate.
2½ lbs. Potassium Dichromate.
5 lbs. Sulphuric Acid.

Then wash and dry.

The shade produced in this way will be found very fast to light, air, acid, and souping. (See recipes, for 1898, Nos. 11, 23, and 186; and, for 1899, Nos. 5, 11, 28, and 39).

RECIPE NO. 116.

Black on Worsted Yarn.

Anthracene Chrome Black F R on 100 lbs. of worsted yarn.

Prepare dye bath with

5 lbs. Acetic Acid.
5 lbs. Anthracene Chrome Black F R.
(Wm. J. Matheson & Co., Ltd., 182 Front St., New York.)

Enter the yarn and work at a boil for ½ to ¾ of an hour.

Then lift the yarn, cool slightly by adding cold water, and add

7 to 8 lbs. Bisulphate of Soda

or

3 to 3½ lbs. of Sulphuric Acid.

Continue the boiling until the bath is exhausted, then add

1¼ to 1½ lbs. Bichromate of Potash

and boil ½ hour longer. Then wash and dry.

Anthracene Chrome Black F R produces black of a brownish tone, which is extremely fast to washing, light, milling, steaming, alkalies and acids. It stands carbonizing, which renders it suitable for dyeing loose wool. It dyes evenly and its penetration is excellent, thus rendering it valuable in the dyeing of heavy goods and felts.

RECIPE NO. 117.

Yellow on Cotton Yarn.

Diphenyl Chrysoine on 100 lbs. of cotton yarn.

Prepare the dye bath with

1 lb. Diphenyl Chrysoine.
(John J. Keller, 104-106 Murray St., New York.)
20 lbs. Common Salt.

Enter yarn at 180° F., bring to a boil and boil at least one hour with constant working.

Diphenyl Chrysoine gives a very deep shade with a small amount of coloring matter, goes on the fibre evenly and penetrates well.

RECIPE NO. 118.

Blue on Cotton Yarn.

Direct Blue 5 B on 100 lbs. cotton yarn.

Prepare dye bath with

3 lbs. Direct Blue 5 B.
(Anchor Color Manufacturing Co., 462 Cherry St., New York City.)
25 lbs. Salt.

Enter yarn at 160°, bring to a boil while turning, and turn one hour at that heat. For further lots use one-third less color.

Direct Blue 5 B will also dye fine shades of blue on cotton and wool mixed goods. It will also combine with other direct dyes and work well in combinations.

RECIPE NO. 119.

Blue Black on Cotton Yarn.

Direct Blue Black 2 B on 100 lbs. of cotton yarn.

Prepare the bath with

15 lbs. Glauber's Salt.
¼ lb. Soda Ash.
6 lbs. Direct Blue Black 2 B.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)

Dye for one hour at a boil with constant working and then work for ¼ hour while the bath cools.

Direct Blue Black 2 B is extensively used in combination with other colors to produce blacks and dark blues.

Dark navy blues may be obtained by dyeing in combination with Benzo Chrome Black B.

Cheap blues may be obtained by dyeing with 2½% Direct Blue Black 2 B, and topping with Methyl Violet ¼% and Methylene Blue 1/6%, in the rinsing bath. Owing to its solubility and excellent dyeing properties it is well suited for the dyeing of raw cotton.

RECIPE NO. 120.

Violet Black on Woolen Cloth.

The Amend Mordanting Process for 100 lbs. of woolen cloth.

(Controlled by the Amend Process Co., 205-211 Third Ave., New York.)

Prepare bath for mordanting with

6 lbs. Acetic Acid 30%.

Work the cloth one-half hour at 140° F., lift the material from the bath (unless the dyeing machine is so constructed that additions may be made to the bath without danger of uneven dyeing), and add

1 lb. of Chromic Acid

previously dissolved in water.

Work the cloth after the addition of the Chromic Acid one-half hour, allowing the temperature of the bath to drop. At the end of this period

6 lbs. of Bisulphite of Soda

are added to the bath, and temperature raised to 140°, and the cloth worked for ½ hour at this temperature. Rinse or pass through hydro-extractor and dye in bath containing

10 lbs. Alizarine Black W B.
(Pickhardt & Kuttroff.)
1 lb. Cloth Red 3 G A.
(Berlin Aniline Works, 72 Front St., New York.)

Enter goods at ordinary temperature, bring to a boil and boil one hour. (See recipe 64, April, for comments).

RECIPE NO. 121.

Violet on Cotton Yarn.

Sulphon Carmine B Extra on 100 lbs. cotton yarn.

Prepare dye bath with

5 lbs. Sulphon Carmine B Extra.
(C. Bischoff & Co., 87 Park Place, New York.)
5 lbs. Alum.
10 lbs. Glauber's Salt.

Enter yarn at 180° F., bring to boil, and dye at that temperature for one hour. Wash and dry.

RECIPE NO. 122.

Brown on Cotton Yarn.

Brown M X I on 100 lbs. of cotton yarn.

Prepare the dye bath with

3 lbs. Brown M X I.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)
20-25 lbs. Common Salt.

Introduce the yarn a little below the boil, raise slowly to the boil and dye at this temperature for one hour.

The above amount is for the first bath. If used a second time, these amounts may be diminished considerably.

Brown M X I penetrates the fibre thoroughly and evenly, and is fast to washing.

RECIPE NO. 123.

Black on Worsted Yarn.

Soudan Black No. 2 on 100 lbs. of worsted yarn.

Prepare bath with

10 lbs. Glauber's Salt.
4 lbs. Sulphuric Acid.
8 lbs. Soudan Black No. 2.
(Sykes & Street, 85 Water St., New York.)

Enter yarn at 140° F., bring to a boil while turning, and turn 1½ hours at that temperature.

The range of Soudan Blacks will be found to give excellent satisfaction to the dyer for their fastness and cheapness, and because they will combine with acid dyes for the production of deep shades. (See recipes 130, 152, 167, 172 and 192 in our 1897 supplements).

RECIPE NO. 124.

Red on Cotton Yarn.

Direct Fast Red 6 B on 100 lbs. of cotton yarn.

For dyeing 100 lbs. of yarn, prepare the bath as follows:

5 lbs. Direct Fast Red 6 B.
(O. S. Janney & Co., 8-10 Letitia St., Philadelphia, Pa.)

Dissolve in

50 gallons of boiling water

with the addition of

2 gallons Caustic Soda Lye

made by dissolving

27 lbs. Caustic Soda in
10 gallons of water.

When the dyestuff is dissolved and the caustic soda been added, stir into the dye bath

150 lbs. Common Salt

until completely dissolved, and then add enough water to bring the bath up to 100 gallons. Dye the yarn for one-half hour at a temperature of 180°.

Wash until the water is no longer colored, and then add to the last wash water

½ pt. Sulphuric Acid,

or, better still,

2 lbs. Alum.

The dye bath must always be kept up to this strength, and subsequent lots require but

3 lbs. Direct 6 B.
1 qt. Caustic Soda Solution (as above).

The dye bath should be kept up to the same number of degrees hydrometer, by the addition of small amounts of salt.

The same comments found in recipe 104 relating to Direct Fast Red 4 B apply to 6 B, except that instead of giving a fiery scarlet shade, it gives a full shade of Turkey red.

By using Direct Fast Red 4 B and 6 B, in equal quantities, a near match for alizarine shade is produced.

RECIPE NO. 125.

Catch Shade of Brown on Cotton Yarn.

Diphenyl Catechine G on 100 lbs. of cotton yarn.

Prepare dye bath with

½ lb. Diphenyl Catechin G.
(John J. Keller & Co., 104-106 Murray St., New York.)
20 lbs. Common Salt.

Enter yarn at 180° F., bring to a boil and boil at least one hour with constant working.

Diphenyl Catechine G gives an almost perfect shade of cutch brown, and, owing to the small amount of dyestuff used can be produced at a low figure.

RECIPE NO. 126.

Dark Blue on Cotton Yarn.

Diamine Deep Blue R on 100 lbs. of cotton yarn.

Prepare dye bath with

15-20 lbs. Glauber's Salt.
1 lb. Soda Ash.
3 lbs. Diamine Deep Blue R.
(Wm. J. Matheson & Co., Ltd., 183 Front St., New York.)

For light shades the amount of Glauber's Salt may be diminished to 10 lbs. or even less.

Enter the goods just below the boil, bring to a boil and dye at this temperature for at least 1 hour.

Diamine Deep Blue R ranks among the fastest of the direct cotton colors, in regard to fastness to light, washing, acids, pressing, etc.

RECIPE NO. 127

Yellow on Cotton Yarn.

Direct Yellow R Extra on 100 lbs. of cotton yarn.

Prepare dye bath with

20 lbs. Common Salt.
2 lbs. Direct Yellow R Extra.
(Farbenfabriken of Elberfeld Co. 40 Stone St., New York.)

Enter yarn at 180°-190° F., bring to boil, and dye at this temperature for at least one hour.

As with other direct cotton colors the bath should be kept of as small volume as possible.

Direct Yellow R penetrates the fibre thoroughly, dyes evenly, and has a very high coloring power.

RECIPE NO. 128.

Black on Worsted Yarn.

Nerol B B on 100 lbs. of worsted yarn.

Prepare the dye bath with

10 lbs. Glauber's Salt.
3 to 6 lbs. Acetic Acid (9° Tw. or according to hardness of water.)

Boil and then cool the bath down to about 190° F., and add,

5 lbs. Nerol B B
(Berlin Aniline Works, 73 Front St., New York.)

previously dissolved in water.

The yarn is now entered, and turned frequently while the bath is brought to a boil, and dyed at this temperature until the bath is exhausted.

The black produced in this manner, has an extraordinary fastness to washing, thus rendering it valuable for knitting yarn, hosiery, flannels, and any goods which have to stand a severe washing. (See recipe 128, in which Nerol B is used.)

New Dyes.

We present in this issue a number of dyes new to our columns, to which we desire to call the especial attention of dyers. The colors produced by the use of these dyes, as shown in our Dyers' Supplement, will be regarded as very handsome, and adapted to the commercial wants of manufacturers.

C. Bischoff & Company, New York, furnish in recipes 113 and 121, Diazyl Garnet and Sulphon Carmine B Extra, for the production on cotton yarn of two shades of violet. The Diazyl Garnet has all the advantages of similar colors, and the shades produced have very good money value. The Sulphon Carmine B Extra is regarded as one of the strongest chrome shades manufactured.

In recipe 114 there is shown Carbide Black R I, procured from A. Klipstein & Company, New York, for the production of a black on cotton yarn. This dye is placed upon the market as a very cheap one-dip black for cotton, producing, when used alone, a blue shade, but which can be readily made a jet black by the use of a little yellow. This dye will color mixed wool and cotton goods, and is very fast to alkalies upon wool.

William J. Matheson & Company, New York, show two of their dyes (Anthracene Chrome Black F and Diamine Deep Blue R), in recipes 116 and 126. Anthracene Chrome Black has met with good success in fast wool dyeing. This is an important wool dye, yielding a solid black on yarn, loose wool, slubbing, piece goods and hats. Diamine Deep Blue R is peculiarly adapted to cotton dyeing, and can be used to good advantage in dyeing cotton and silk mixed goods, the silk being scarcely tinted.

John J. Keller & Company, New York, in recipes 117 and 125, show two new colors on cotton yarn, one a yellow and the other a cutch shade of brown. An examination of these shades, as they appear in our Dyers' Supplement, will show the character of the dyes to good advantage. Diphenyl Chrysoine is tinctorially a very strong color, and with one per cent. of dye, as used in our recipe, a full yellow can be obtained. The shades produced are very fast to light. When dyeing cotton and wool mixed goods, it colors both fabrics alike. Diphenyl Catechine G, as used in recipe 125, is for dark shades. Lighter shades can be produced by the use of a less quantity of salt. The shades produced by this dye are very fast to light and washing, and when woven next to whites, hardly colors them. If passed through three per cent. of blue vitriol, after dyeing, the shades are made absolutely wash fast, and the light fastness being improved.

The Direct Blue 5 B, obtained from the Anchor Color Manufacturing Company, New York, found in recipe 118, for a blue on cotton yarn, will find a place in the dyehouse, to meet the current demands for fashionable colors.

The brown on cotton yarn seen in recipe 122, is produced by the use of Brown M X I, procured from the New York & Boston Dyewood Company, New York. This dye commends itself, on account of its shade and easy dyeing properties. The sample as seen in our Dyers' Supplement will speak for itself.

Farbenfabriken of Elberfeld Company, New York, show in recipes 119 and 127, two colors on cotton yarn—one a blue black, and the other a yellow, produced respectively from Direct Blue Black 2 B and Direct Yellow R Extra. Direct Blue Black 2 B closely approaches, in most of its properties, the older brand, Direct Blue Black B, differing only in its brighter blue shade and cheaper price. This new dye is adapted for the production of blacks, either when employed as a self color, or in combination. Dark navy blue can be produced with it, when combined with Benzo Chrome Black Blue B. Owing to its solubility and excellent dyeing properties, this new product can be employed for dyeing loose cotton in a machine or apparatus, and also for dyeing yarn, as well as piece goods, its brightness of shade being conspicuously displayed in the latter case. It discharges well with tin crystals, and also with zinc powder. Direct Yellow R Extra is regarded as a strong color, and it is claimed for it a rank amongst the fastest direct yellows in the market, with regard to washing and light.

Glugloss-Gelatine.

This material is especially adapted for transparent finishing, water-proofing, stamping Dutch metal, gilt and bright color printing, and is sold by the Quaker Chemical Company, 1834-46 Bristol St., Wayne Junction, Penn.

Where required, this material furnishes a high lustre and transparent glaze to the fabric, besides making the goods firm but yet pliable, with a soft, leathery touch.

A valuable feature of this product is the water-proof finish it develops, thereby obviating the stickiness oftentimes occurring in handling the goods after being sized with glues, etc.

For filling purposes "glugloss-gelatine" holds the color or clay in suspension, sets quickly, flows readily, and penetrates the fibre and pin-holes. It mixes readily with glue or starch, and for the purpose of creating additional yet pliable stiffness to the goods, mix

a proportion of it to the starch or glue and, it is said, better results will be obtained than secured from the use of starch or glue alone.

For sizing yarns it penetrates the fibre, making the yarn elastic, readily overcoming the hitherto objection often occurring in the cutting and gumming of the harness when weaving, from the use of glues, starch, etc.

The manufacturers have received valuable testimony from those who have used "glugloss-gelatine," as a superior softener, size and filling medium for cotton goods, as it carries very well such materials as clays and other weighting agents.

When used alone or in connection with other pastes, such as sago, farina, starch, or flour, or with tragacanth, it makes a welcome adjunct to every finishing room.

For plushes and velvets it imparts a most desirable "feel" or "handle" to the goods.

For warp and yarn dressing, it imparts both strength and elasticity.

As a medium for carrying colors for printing it is highly recommended by those who have used it, especially for pigment colors, lakes and powdered metals.

Improved Machinery for Drying and Carbonizing.

In the equipment of the modern mills, the handling of the raw stock is receiving well-deserved attention and the older forms of table-dryers are being replaced by the latest forms of automatic stock dryers, which in first cost are practically no more expensive than the old style dryers, and at the same time result in saving considerable labor, heat and power, as well as taking up much less floor space.

Those who have heretofore used table-dryers, where the stock required turning several times before it was thoroughly dry, will appreciate the "Hurricane" automatic stock dryers, built by the Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, and illustrated herewith.

The advantages of a self-feed in opening up the stock and distributing it uniformly on the apron of the dryer are well known.

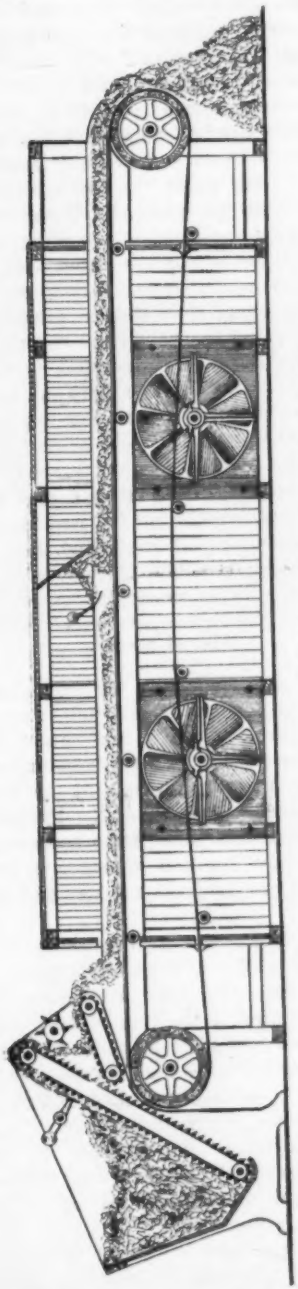
The self-feed illustrated is very substantially built with iron sides and is provided with a spiked apron for elevating the stock to a point from which it is removed by a revolving beater and dropped to a transfer apron, which delivers it to the dryer. By this means there is no excessive weight of wet stock on the apron at the feed end of the dryer and a much larger quantity of raw stock can be conveniently handled by the self-feed. When handling long-staple materials, such as wool and worsted, an adjustable comb is attached, which regulates the amount of stock carried up by the spiked apron and also prevents the choking of the machine.

If desired, the machine can be fed by hand and the self-feed dispensed with temporarily, provision being made for this purpose.

After the stock is opened up by the self-feed and distributed to the dryer, as it enters the machine it is subjected to the greatest heat. The steam which is thus driven off is carried away by an exhaust fan. The machine being divided into compartments, the heat is regulated independently in each and it is possible to grade the temperature so that the stock is finally delivered thoroughly dry and in a cool condition.

The grading of the temperature during the drying, as the wool travels toward the delivery end of the machine, is a point upon which great stress is laid by the builders. This fact of the stock being subjected to the greatest heat as it enters the machine and where it contains the most moisture to counteract the effects of the heat, is claimed to prevent all possibility of the stock "baking" or becoming harsh. The temperature being gradually reduced in the successive portions of the dryer, the stock is finally delivered dry, cool and in a soft, lofty condition.

Carbonizing: The arrangement of an automatic machine for carbonizing



INTERIOR OF ONE SECTION AUTOMATIC DRYER WITH SELF FEED.

wool, noils or rags is somewhat different from a standard dryer, and, when ordered especially for carbonizing purposes, the machine is constructed with the following points in view. In order to do thorough and complete carbonizing, it is necessary to maintain a dry atmosphere at a high temperature. If cold, wet stock is allowed to enter, therefore, it counteracts the conditions most essential for carbonizing. Before the stock enters the carbonizing compartment in these machines, it is first thoroughly dried and the surplus moisture removed by an exhaust fan, but the balance of the air is returned over the steam pipes and heated before being again forced through the wet stock, this operation of recirculating the hot air being utilized to such an extent that the greatest economy is attained in the use of the steam. Traveling continuously from the drying into the carbonizing chamber, a high, dry heat is then easily maintained.

All of these automatic machines are enclosed in a framework of yellow pine and poplar, which being mortised, tenoned and joint-bolted, with a sheathing of kiln-dried, beaded fencing makes a very substantial construction.

The steel-blade fans and the mechanism for operating the machine and driving the apron are all of good design and more than sufficient strength to stand the most severe tests. Cone pulleys and a worm, the latter running in oil, give a range of several speeds to drive the wire apron, which can be stopped in a moment by means of a clutch-gear. Only one apron is used and it is returned at each end of the machine over large drums, thus ensuring good wearing qualities for the wire.

The builders direct special attention to the wire aprons made especially for these machines for their claimed superiority in form and construction, insomuch that there is no breakage, due to the apron bending around drums of small diameter. They inform us that these wire aprons are giving general satisfaction. When desired, the dryers are arranged on the exhaust steam

system, and great economy has resulted in mills adopting this method.

The wire aprons vary in width from four to twelve feet and, as the Philadelphia Drying Machinery Co. build about twenty-five standard sizes of automatic dryers and other special sizes when required, the capacity varying from 1000 pounds to 15,000 pounds per ten hours. They will be pleased to quote on any capacity and give the floor space, height and power required.

The fact that the highest of their machines are less than seven feet, enables them to be installed without making expensive alterations.

The advantages of the automatic system are still further appreciated when handling cotton stock by this method, as the stock is made perfectly uniform; and being thoroughly cleaned during its passage through the dryer, it naturally follows that it must be easier on the cards. This opening up of the cotton stock and thorough picking apart of the wet fibres is accomplished by the rapid action of the "openers," which not only blend the stock and shake the grit and dirt out, but aided by the force of the air, also render quick and uniform drying a possibility.

In addition to their well known "Hurricane" fans, the Philadelphia Drying Machinery Co. build dryers on both the automatic and the truck systems, for drying skein yarn, piece goods, hair and other fibrous materials.

The Naphtindone Case.

In connection with the infringement suits and injunctions in the case of the dyestuffs Bengaline and Naphtindone, Messrs. Wm. J. Matheson & Co., Ltd., under date of July 15, issue a circular to the trade, from which we quote as follows:

"We think it well to point out to the consuming trade that the Naphtindone patent was not before the court, when judgment was obtained against the makers of Bengaline, and although an injunction was granted, restraining the sale of Naphtindone, no evidence has, as yet, been submitted to connect this color with that of Bengaline or Indoine.

"A suit to determine the validity of the Naphtindone patent is being pressed with all possible speed, and we expect soon to have a determination in our favor. In the meantime, we shall be glad to furnish our friends and consumers generally, with any other of our specialties, and in this connection we venture to renew our standing offer that, in consideration of the purchase from us of any of our colors, we guarantee to hold the purchaser harmless from any damages which may result from any suit for infringement, which may be brought against him, as a result of any such purchase, always provided that the conduct of the case is intrusted to our attorneys, and that we are promptly notified when the proceedings are commenced."

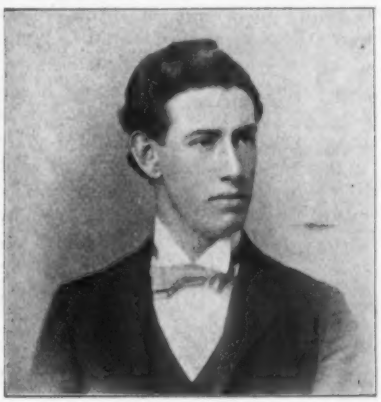
Wilfred Senior.

We give, herewith, the portrait of Wilfred Senior, who was awarded the Textile World's gold medal for the best results in final examinations and term work in dyeing, at the commencement exercises of the Philadelphia Textile School. Some account of these exercises and reference to Mr. Senior was made in our last month's issue.

Mr. Senior was born in Dewsbury, County of York, England, August 4, 1876, and came with his parents to this country in the year of 1884, and has since resided with them at Sanford, Me. During the past five years he has been employed in the coloring, mixing and dyeing department of the Sanford Mills. He proposes to attend the Philadelphia Textile School next year to complete his course in chemistry and dyeing.

We have been privileged to examine the experiment book of dyed samples, which represent Mr. Senior's work, for which he secured the Tex-

tile World's medal. This book contains experiments in dyeing, showing samples of dyed cotton, silk, wool, mohair and union goods. The arrangement of samples and its general conception reflect great credit upon the author. The samples show the effect of sunlight, scouring and fulling tests upon the colors. The most marked and interesting changes



WILFRED SENIOR.

are those showing the actinic effect of the sun. In some instances, the colors are bleached out to a pure white, after being subjected to sunlight for forty days, which was the length of time to which all of the samples were exposed. Mr. Senior has every reason to feel proud of his work.

—We recently saw samples dyed by the Du Bois Sanitary Fast Black Process and were very favorably impressed with them. The lisle thread finish was remarkably handsome, and we understand is peculiarly their invention, and we believe has not yet been attempted abroad. Messrs. Calmore & Co., patent attorneys, 501 Chestnut St., Philadelphia, who are agents for the sale of the process, mention the interesting fact that New York jobbing importers have recognized the superiority of this black to the extent of importing goods in the white and having them dyed by the E. G. Chester Dyeing Co., with that dye work's name attached instead of Hermsdorf, who formerly did their dyeing.

—A Swiss chemist has patented a method of imparting a silky lustre to animal and vegetable fibres, as well as a certain amount of stiffness. The process simply consists in treating the goods with starches or glue, which may either be added to the mercerizing bath or applied first in a separate bath. The stiffness and feel of the goods may be regulated by using various strengths of solution of the stiffening material. To get a hard touch and a silky lustre, for example, about 300 grammes of starch are dissolved in 10 litres of soda lye, marking 20 deg. B. After ten minutes' immersion in this, in a slightly stretched state, the yarn is washed with water, soured, and again washed. The yarns require no subsequent dressing.

—A very simple process for waterproofing is to impregnate the fabric with a mixture of albumen or gluten with a solution of india-rubber or guttapercha, together with a little antiseptic and glycerine, or some other softening material. The albumen is coagulated by heating the soaked fabric.

—The United States Worsted Company, to which we referred in our last month's issue as in the process of organization, has completed its organization and will begin operations in a short time. The headquarters of the company will be in Philadelphia. George Campbell, one of the largest spinners of worsted yarns in the country, is said to be slated for the presidency.

—The War of the Revolution had not far progressed before the people and the Continental army had occasion to realize that the lack of proper facilities for supplying clothing was the weakest point in their outfit for the struggle upon which they had embarked.

Shades and Bright Colors.

The term "shade" is a very general one, and signifies all the tertiary combinations in their endless variety, which are simply the primary and secondary colors dulled with varying proportions of grey or black. Such colors have been described as "shades of tints," as they are merely intermediates between some clear color and black. All the many colors known as mode, or fashionable shades, belong to this class. In commerce, however, the word "shade" is greatly misapplied, and has become almost synonymous with color itself. Thus we often hear of a pure shade of yellow or a clear shade of green, intending to denote pure and bright colors; but such a use of the word is not altogether correct. We might as well talk of a pure flat yellow or a clear dull green. The series of gradations of a color weakened by the addition of white, or deepened by the addition of black, are often called the tones of a color, but, as we have already stated, they may be described as tints or shades. What are often termed sombre colors are those belonging to the blue and violet class and the broken tones of luminous colors. Such colors are sometimes termed flat or sad colors.

Primary and secondary colors are easily matched from the innumerable coal-tar dyes now at the command of every dyer. It is in the matching of tertiary shades in their innumerable varieties that skilful color matching is required. The slightest predominance of any one primary gives the color a different cast, and makes it belong to another class of hue. Every dyer must have found the difficulty of matching many tertiary shades. Some of them, especially sages, buffs, and a variety of grays, are extremely sensitive to the different qualities of daylight, and such shades are sometimes found to present a different appearance in the morning from that of the afternoon.

Bright Colors.—In examining bright colors such as acid magenta, the various bright pinks like rhodamine and the cosines, orange and scarlet, dazzle the eye, and they produce a certain eye fatigue which renders it incapable of distinguishing nice distinctions of color. In such cases it is necessary to have a piece of material complementary in hue to the color examined, as, by occasionally viewing it, the eye is restored quickly to its normal condition. In matching such bright colors as we have mentioned, a piece of material dyed green will be suitable for this purpose. A useful method in examining such colors is to view them through a blue or green tinted glass or gelatine film. By viewing bright colors in this way the discomfort of eye fatigue is escaped, and a more correct judgment of the color is obtained. As an example of the appearance of such colors under a green glass, we may give the following:—

Scarlets appear light browns.

Oranges appear soft shades of old gold.

Yellowish pinks appear pinky browns.

Blue pinks appear dull red violets.

Magenta, rhodamine and similar pinks appear red violets.

Purplish reds appear blue violets.

This method of examining colors also reveals any unevenness in the dyed or printed color which is not readily detected by the unaided eye. We here give the complementaries of a few of the bright colors which will be found useful in restoring the eye when overfatigued by the viewing of these bright colors.

Green blue is complementary to red.

Greenish blue is complementary to orange.

Turquoise blue is complementary to orange yellow.

Blue is complementary to yellow.

Violet blue is complementary to greenish yellow.

Red purple is complementary to emerald green.

Blue green is complementary to crimson.

If we place side by side two colors belonging to the same class but of different depths, the observer will notice a slight modification both in the quality and the intensity of the colors, as they appear slightly different from what they do when examined separately. The lighter color will appear, to the eye lighter, and the deeper color will appear really deeper from its juxtaposition to the lighter color. It will be noticed that these modifications are most marked at the line of contact, or where the two shades meet each other. This is what is known as contrast of tone. At the same time, it will be noticed that the colors appear slightly different in hue, each color appearing as different as possible from the other. This is what is known as contrast of color. These two modifications, namely, contrast of tone and contrast of color, constitute what is termed the simultaneous contrast of color. When the eye of the observer sees two different colors side by side, they appear as different as possible, both as regards tone and hue. Thus, for example, we cannot make a correct judgment in matching a yellow on a ground of greenish blue, as the complementary orange appears added to the yellow, thus making it a redder hue of yellow than is actually the case while the greenish blue ground appears bluer to the eye from the addition of blue which is the complementary of the yellow. Every colorist has noticed also the greenish appearance of a black which is in the midst of a crimson ground owing to the addition of the complementary color, namely, blue green.

When we examine a color for a certain time until the eye gets fatigued, the eye spontaneously calls up the complementary color, which, being added to the color examined, makes it appear much duller, as if a quantity of gray had been mixed with it. This may be seen in gazing for a few seconds at a series of bright scarlets. They shortly assume a dull terra cotta appearance. This action of the eye in calling up a complementary color, constitutes what is known as successive contrast. It was this apparent difference in colors, caused by contrast, that led the French chemist Chevreul to investigate the laws of the contrast of colors. While he was director of the dyeing department of the Gobelins several complaints arose regarding the colors which were dyed. It was complained that the blacks were wanting in vigor, but this, on examination, was found to be owing to the color which was next them and was due to the phenomena of color contrast. He then commenced his researches on the simultaneous contrast of colors. From the above it will be seen that to make a perfect match of any color we must have no decided color in juxtaposition. In matching carpets, cloth and other dyed materials, it is better to take a small piece out of the original and place it on the material you have dyed. Dyed materials may be examined in two ways, either by reflected or transmitted light. In examining by reflected light, the colors are placed side by side and viewed by looking straight down upon them. By the transmitted light method the dyed material is held up to the light in a line with the eye to enable the eye to catch the colored light which is transmitted through the surface fibres of the material. This "overhand" or transmitted light method is useful when examining very dark shades, such as dark navy blues, marones, deep olives, clarets and similar dark colors.—D. Paterson in the Dyer and Calico Printer.

—For the past few years there has been considerable friction in several of the East Lancashire weaving districts, arising from the introduction of new or the modification of old sorts of fabrics, the alterations in which were not distinctly provided for in the Uniform List. Many small strikes have resulted and much money has been expended upon fruitless attempts to decide whose claims or wills should be imposed upon the other party: employers or employed.

Waterproof Cotton Fabrics.

In the Farber Zeitung, Gruene describes a process for waterproofing stout cotton fabrics, such as are used for tents, awnings, etc.; no doubt, the same treatment would be suitable for preparing printers' grays or wash blankets. The directions given by the author apply more particularly to a fabric having a double warp of 40s yarn and a triple weft of the same count; the pieces are 30 yards in length; they weigh 23 pounds from the loom, and about 29 pounds finished.

The first step is to remove the size, which is effected by running 3 pieces for 1 hour in the jigger through a boiling bath of 7 pounds of 66 per cent. silicate of soda in 40 gallons of water. The cloth is then lightly nipped and air-dried. The waterproofing process proper combines impregnation with alumina soap and with rubber and wax. It can be carried out in either two or three baths. In the former case, the first bath is acetate of alumina of 6° Be.; the second, silicate of soda; the third, a soap solution, in which rubber solution and melted wax have been incorporated. In the 2-bath process the passage through silicate is omitted. This latter method yields a thicker and closer finish.

The impregnation with acetate of alumina, produced by double decomposition between 25 parts of alumina and 18 parts of sugar of lead and standing at 6° Be., takes place by padding the cloth five to six times and air drying. Fixation with silica, if desired, is effected on the jigger by giving three to four ends lukewarm in 3 pounds of silica 66 per cent. to 40 gallons; nip and air dry.

To prepare the necessary rubber solution, 4½ pounds of good para-rubber are cut into small pieces, placed into a pot standing in warm water, and covered with two gallons of turpentine. Let this stand, well covered, for four days, stirring frequently, then add another 22 gallons of turpentine and steep again for four days. A thick, sticky solution results, which is now, with the help of a stiff brush, worked through a sieve having 25 meshes to the square centimetre, and again through a finer sieve. The residue having been got into solution by a second treatment with a small volume of turpentine, the whole is diluted with another 2 gallons of this solvent, and after a few days' standing the solution is forced through a third and still finer sieve.

Meantime 35 pounds of beeswax are melted in a jacketed pan; to this are added 2½ gallons of linseed oil, and the mixture boiled up. On the other hand, 40 pounds of resin soap are cut up and dissolved in a pan heated by a coil, in 25 gallons of condensed water.

The rubber solution, prepared as above, is now worked into the boiling oil and wax, and when thoroughly mixed the whole is run through a fine sieve into the boiling soap; when uniform, make up with condensed water to 50 gallons.

The cloth, already prepared with alumina, as described, is now padded with the boiling rubber-soap preparation, contained in a box fitted with steam coil, between a wood padding and a brass friction-bowl, plaited down, and hung up to dry. The padding is then repeated with reversed pieces, and, if the cloth be still insufficiently filled and porous, both sides are coated once over. Care must be taken to avoid alumina passing into the bath, where it forms a sticky and adhesive precipitate, causing stains and stripes; and for this purpose, whilst feeding, a few quarts of boiling-hot strong soap are occasionally put in the box. As a rule, 15—16 pieces require about 40 gallons of varnish.

—The wild silks, of which Tussah silk is the best known, can replace the cultivated product in certain of its applications, e. g., the manufacture of pile fabrics, but are inferior to it in color and uniformity.

A Mercerizing Machine.

George W. Miller, Woonsocket, R. I., has just patented an apparatus for supporting skeins in dyeing, mercerizing, etc., the object being to facilitate the processes of manipulation.

The operation of this mercerizing machine is as follows: There are two or four steel tanks, 40 by 40 inches deep, placed upon the floor or let in the floor. Between and in centre of these tanks is a pedestal step, receiving an upright shaft supported at the top by a ceiling hanger and bearing. On said shaft is a column supported with ways for the two machines to roll up and down on. When the left-hand machine is lowered into the mercerizing tank and while there, the right-hand machine is stripped of the finished yarn and a new lot put on. Next, the left-hand machine is raised out of the tank, when the right-hand machine at the same time descends, and when both machines are on a level, the upright shaft with the machines is revolved until the machine with the mercerized yarn is in position to descend into the hot water tank. When raised out of the hot water tank, it is again revolved to the scouring tank, and after raising from that it is revolved again to the rising tank, which completes and finishes the yarn. The other machine, having the yarn for mercerizing, is let down in the mercerizing tank and operated as described. The yarn is stretched by power, by means of screws, gears and belt, and when the machines are in the tanks the spindles holding the yarn are revolved by power with the same belt, so that the yarn in moving and carried in belt shape through the solutions.

The two machines are united by strong cable wire ropes, running over sheaves on cross beam attached to the upright shaft above, thereby counterbalancing each other, requiring but very little power to raise or lower them, and the revolving of same from one tank to the other is just as easily performed.

Germany's Wool Import.

A noteworthy change in favor of South American wool has taken place in German imports within the last few years. Whereas formerly wool from the English colonies, especially Australia, formed the main portion of German wool imports, the Argentine Republic has taken since 1897 first rank among the countries interested in supplying this market.

The German wool imports from Great Britain consist almost exclusively of Australian and Cape wool. According to official statistics, furnished by United States Consul Louis Stern, of Bamberg, Germany imported in 1898 about 15,652,660 pounds of Australian and Cape wool and about as much in 1897, against 213,846,200 pounds in 1895. The wool imported from the Argentine Republic, including that from Belgium, which is mainly of Argentine origin, amounted to 204,366,420 pounds in 1898, against 169,754,200 pounds in 1897 and 165,345,000 pounds in 1895. The falling off in the imports of British colonial wool is chiefly due to the decrease in the imports from Australia; the latter have, since 1895, gone down by one-third. A further decrease in the imports of wool from that country is to be expected during the next few years; for, according to a report from New South Wales, the prolonged drought has caused the colony a direct loss of about 20,000,000 sheep, and the whole production of Australian wool has, in a single year, gone down from 1,500,000 to 250,000 bales of wool.

—There is a dearth of original and meritorious work, but a profusion of the common and indifferent kind; yet the producer is only partially responsible for the results.

—It is sometimes observed that if the designer would only invent patterns characterized by beauty of form and composition, they would command a market.

QUESTIONS AND ANSWERS

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

Wool Prices.

Editor Textile World:

Is the price of wool quoted in the different papers, the price in the markets, or that paid to the farmers?

D. T.

The prices that our correspondent sees quoted in the papers are those for the markets where the papers are published, and notes the selling prices to the consumer, or manufacturer.

Book on Combing.

Editor Textile World:

Can you inform me whether there is a book published devoted entirely to combing worsted? I have McLaren's book on "Spinning Woolen and Worsted," but it does not give me the information that I am after.

J. N.

The book that our correspondent has is the best book that is published on spinning worsted. There is an excellent book, however, entitled "Wool and Wool Combing," by James Burnley, published in 1889, but which is still up to date, that can be secured for about $6.

Knitting Machines for Underwear.

Editor Textile World:

Can you tell us the size of machine samples of ladies' cotton ribbed underwear are knit on, 12, 13 or 14?

H. G.

We have given the question exactly as it has been put to us, but it is somewhat obscure. If we comprehend the meaning of the inquiry, we will say that it depends entirely upon the gauge or number of needles in the machine for the size of goods or garments 12, 13 or 14-inch machines will make. Some manufacturers number their goods differently from other. Ribbed goods run in sizes from one to six in ladies' vests, and it depends upon the class of goods that are made by any particular manufacturer for determining the size of machine they are made on. The sizes of machines mentioned are those chiefly used in making ladies' underwear.

Mercerizing Cotton Cloth.

Editor Textile World:

Will you kindly send us the names of some firms that mercerize cotton cloth, and any other information that you may wish to furnish us in this matter?

N. H.

We have replied by mail, giving the names of parties that do this work. Possibly there are bleacheries which we have not mentioned doing work of this kind, as we believe nearly all bleaching establishments are giving more attention to mercerizing yarn and cloth.

Book on Cotton Spinning.

Editor Textile World:

Will you kindly recommend to me a good book on cotton spinning, also price? I want an illustrated volume which will not be based too much on theory, showing the details of construction of the machines for making a cotton thread.

L. B.

If our correspondent will look in most any of the issues of this magazine, he will see a list of textile books that we regard as standards, giving price, etc. All of these books are thoroughly practical, as far as it is possible to make them. The authors have to theorize more or less when they describe the functions of different parts of machines, so as to give them value of a general nature, applicable to all machines. If our correspondent wants to get the details of construction of any particular machines, he will have to write for a catalogue of those that make the machines in question. If a man is a practical spinner, he will be able to utilize the theories in books, practically.

Roll Covering Tools.

Editor Textile World:

Can you send me information concerning roll covering tools, and where I can obtain them. I have written to several parties, but fail to get a satisfactory response.

H. L.

We have replied by mail, sending the desired information, together with illustrations of the tools that are used for this purpose. By writing to the Ameri-

can Supply Company, Providence, R. I., this information can be obtained and all the necessary details.

Automatic Loom Company.

Editor Textile World:

Can you tell me what has become of the Automatic Loom Company, which was at one time operating under the Hunt patents, with certain improvements? S. L.

We do not know what this company is now doing. There were two companies formed to exploit this loom, each with a nominal capital of $5,000,000. One company was regarded as the parent company, owning the patents, and the other a subsidiary one, owning rights for the United States, Canada and Mexico. It was stated at one time that the parent company was offered $5,000,000 for its European rights, but the offer was refused. About nine months ago, from $50,000 to $100,000 were wanted to extend the enterprise, but whether this amount was obtained, or not, we do not know. The shares at that time were offered at $1 to $1.50 each.

Where to Learn the Hosiery Business.

Editor Textile World:

I am desirous of taking a course in one of the leading textile schools of this country, and, therefore, ask if you can advise me which school would be of the greatest advantage to me for learning hosiery manufacturing? M. L.

We would suggest that our correspondent write to the following schools: Philadelphia Textile School, Philadelphia, Pa.; Lowell Textile School, Lowell, Mass.; New Bedford Textile School, New Bedford, Mass. He will be better able to judge of his wants after perusing the information that will be sent to him.

Utopia.

Editor Textile World:

Will you please inform us what concern, if any, is using the word "Utopia" as a brand for fast black hosiery?

So far as we know, there is no one using that name as a trade mark, but in order to be sure, we suggest that you consult a patent attorney, who will look up for you the registered and copyrighted names, and if it is not recorded, we believe you would have the right to use it.

Mercerizing Knit Goods.

Editor Textile World:

In your issue of July, I notice you speak of mercerizing knit goods. I am about to start a plant of my own, and would be pleased to know of this process. M. F. D.

There has been a number of articles in this magazine relating to the bleaching of knit goods, though reference has been made to the mechanical rather than to the chemical method. If you desire any work of this kind, we would suggest your writing to some of the leading bleacheries. We have given further information by mail.

Bleaching Knit Underwear.

Editor Textile World:

I notice, in the June number, an inquiry for a formula to bleach knit underwear. I desire to have the same information. S.

We have answered by mail.

Machine for Mercerizing.

Editor Textile World:

Can you give us the name of the Swiss referred to in your July number, who has invented a machine for mercerizing; also, can you inform us where this machine is made? D. B.

The inventor of this machine is Eduard Heberlein, Wattwil, Switzerland. If our correspondent will write to the Hon. Commissioner of Patents, Washington, D. C., for letters patent No. 624,800, with necessary fee, he will get all of the information that we can furnish him. We presume that the machine is not made in this country.

Knit Webbing.

Editor Textile World:

We would like to know where we can buy knit webbing to use on the bottom of drawer legs. Want it put up in rolls. H. & K.

We suggest your writing to Charles Cooper, Bennington, Vt.

Red with Logwood.

Editor Textile World:

Will you please tell us in plain English how to dye wool red, with logwood? W. W.

We would suggest the following recipe: Mordant with 3% Tartar and 3% Tin Spirits; boil 1½ hours; cool off and leave over night, and dye next day with about 25% logwood chips.

Books on Dyeing.

Editor Textile World:

Will you please give me the names of the best books on the subject of cotton dyeing? R. D.

There is no book devoted exclusively to cotton dyeing, and the only thing that

we can safely recommend to our correspondent, to enable him to keep up with the times, is to subscribe for some good publication that gives attention to the dyeing of textiles, furnishing recipes and specimens of the colors. The art of dyeing changes so rapidly that it would hardly pay to publish a book giving recipes, for anything that would be suitable today would likely be out of date five years hence. We would suggest getting "The Manual of Dyeing," by Knecht, Rawson & Loewenthal; price, $15, which we can furnish.

Mercerizing.

Editor Textile World:

I have been greatly interested for some time in experiments for mercerizing cotton cloth in the piece, and note the article on page 48 of your July number. As we understand this article, the writer recommends making a solution with either of the solvents mentioned, before using the solution of sodium or potassium sulphide. We are in doubt whether or not he directs that a further addition of a ten per cent. solution of the solvents be again made to the sodium or sulphide. We would greatly appreciate it if you would kindly state what your understanding is of this process. We are in the experimental stage with this matter.

R. N.

As we understand the process, as stated by the author, a bath, or solution, is made of sodium or potassium sulphide, to which is added one of the solvents named (benzine, oxidized oils, benzol, etc.). The solvent floats on top of the bath, and, of course, when the fabric passes into the latter, it must go through the solvent stratum before it comes in contact with the mercerizing elements proper. The effect of this is the removal of all grease or fat that is in the fabric, or its dissolution, before entering the mercerizing elements. The process is practically one, as we understand it.

Seamless Pockets.

Editor Textile World:

You would oblige us by giving information where the mill is located that makes seamless pockets for trousers.

Tailors' Trimmings.

The Safety Seamless Pocket Co., A. C. Bent, Agt., Taunton, Mass.

New Publications.

Jacquard Machine. Philadelphia: E. A. Posselt author and publisher. Price $3. This is a new and revised edition of this author's work on the jacquard machine, which is analyzed and explained with 230 illustrations. The contents of the book describes the preparation of jacquard cards and gives practical hints to learners of jacquard designing. This book has passed through three editions, which have met with quick sale, showing the value and need of it to manufacturers, designers, overseers and students in textile manufacturing. In the present new and revised edition, such changes in the description and illustration of jacquard machinery have been made as are necessary to have the work up to date. The purpose of the book is to impart to its readers a clear understanding of the principles underlying the construction of the jacquard machine, tying up jacquard harnesses, card stamping, card placing and designing for jacquard fabrics.

School of Industrial Art of the Pennsylvania Museum. This school, which embraces the Philadelphia Textile School, has just issued its catalogue for 1899-00, which all those interested in textile education would do well to write for. The catalogue contains a historical sketch of the School of Industrial Art and the Textile School, also a description of the equipments, courses of study, requirements for admission, fees, examinations, etc.

New Bedford Textile School Catalogue for 1899-00. We have received the first catalogue issued by this school, which was founded by an act of the legislature of the commonwealth of Massachusetts and by the city of New Bedford. This catalogue consists of 64 pages, handsomely gotten up, giving the names of the trustees of the school, and calendar for the fall and spring terms. The school has a spacious building of brick, centrally located in the city, and is the first building erected for the exclusive instruction in the manufacture of cotton in the United States. It contains everything relating to the school and those interested in it would do well to communicate with its managing director C. P. Brooks.

Cypress Tanks. This is the title of a catalogue just issued by the Cypress Lumber Company, Appalachicola, Fla. The tanks referred to in this catalogue are manufactured of the best quality of all-heart, air-dried cypress lumber.

Metrical Tables. Farbenfabriken of Elberfeld Company, New York, have issued a very acceptable and meritorious book of 88 pages, of tables bearing upon English and metrical systems of weights and measures, especially adapted for the use of those engaged in dyeing and calico printing, also interest, money and miscellaneous tables. This is a revised and enlarged edition of the work that was first issued in 1882, primarily intended to show dyers how to test and compare the value of colors by dyeing small quantities of material. The desire of this new edition is to furnish data which will enable one to rapidly convey quantities from English weights and measures into those of the metrical system, or reverse. A list is also given of the colors of this house, grouped according to their qualities and application. We would suggest dyers writing for the book.

Armour Institute of Technology, Chicago, Ill. This is the title of a catalogue of this institute just issued, with announcements of instruction for the year 1899-00.

Immedial Blue C. This is the title of a color card issued by Wm. J. Matheson & Co., New York. This card is very attractively gotten up, and contains

much useful information that dyers would appreciate, no doubt, and we would suggest to such to write for the card to the publishers.

Brilliant Benzo Green B. A color card relating to this color has just been issued by Farbenfabriken of Elberfeld Company, New York. The colors are upon cotton and the shades are very attractive.

Quarterly Journal of Economics. Published for Harvard University, by George H. Ellis, Boston. This number for July ends Volume 13 of this Quarterly. The July number contains the following articles: Expansion and Protection; On the Value of Money; The Sociological Frontier of Economics; The Preconceptions of Economic Science; The Settlements with the Pacific Railways. With the first number of the next, or 14th volume, the subscription price will be advanced from $2 per year to $3. It is believed that the contents of the journal, as they have been in the past, justify this advance in price.

Bronzing by Immersion. This is the title of a pamphlet of forty pages, issued by the Joseph Dixon Crucible Company, Jersey City, N. J., fully illustrated. It takes up such subjects as Anti-Flux, Crucibles, Dipping, Stoking, Fuel, etc.

Anti-Chlorine. This is the title of a color card issued by Bosson & Lane, 36 Central Wharf, Boston. Anti-Chlorine is said to be largely adopted by bleachers of cotton, as a substitute for acid. Those interested in the bleaching of cotton would do well to write to Bosson and Lane.

Wrapping Tables. This is the title of a small book of 45 pages, published by the Indian Textile Journal Company, Bombay, India, but which can be obtained of Frank A. Nodal, 73 High Ardwick, Manchester, England. Price $1. These tables are for cotton sliver, roving and yarn, more especially adapted for Indian mills. The tables are intended to afford a ready means for determining the count of cotton sliver, etc., when the length and weight are known; thus, in the case of a sliver wrapped to a length, say, 5 yards, and weight 16 dwts., the hank will be .108; and, in a similar way, the yarn from a cop or bobbin, wrapped to a length of 120 yards, and weight 4 dwts., 4 grs., will be 10s count.

The Illustrated Laconian. We have received, with the compliments of the Pepper Mfg. Co. of Lakeport, N. H., an attractive volume, profusely illustrated with views of the important buildings in the city, as well as portraits and biographical sketches of its leading citizens. The aim has been to give a glimpse of Laconia as it has been in bygone days, and as it is today. The book contains a concise history of the town, with its old landmarks, and is a valuable reference work of the place. Laconia and Lakeport are such knitting centres, that it is of particular value in a textile way, as the history of the leading firms and men engaged in the manufacture of knit goods and knitting machinery is recorded in an interesting manner.

Industrial News.

Elevators.

A reliable opinion from reliable people, based on fifteen years' experience, is given below, and is worthy of consideration:—

The Eastern Machinery Co., City.

Gentlemen:—It gives us pleasure to say that we have been using three of the Frisbie elevators for some fifteen years. We find them all right in every way, safe, durable and economical. We are glad to put in our word of commendation.

Very truly yours,
New Haven Clock Co.,
New Haven. Walter Camp.

Where the Breezes Blow.

INDICATIONS POINT TO A BIG SEASON AT THE EASTERN SEASHORE RESORTS.

There is no "seashore scare" this year, unless on the part of those who have reason to fear that they will not have an opportunity of enjoying ocean's breezes, in common with the thousands who are already flocking toward the New England beaches.

This year, the famous "scare," like the Spanish fleet itself, is no more, and the problem will soon be how to accommodate all that are desirous of spending a few weeks, or days, in the soothing and restful company of old Neptune.

As usual, the great trend of seashore travel is toward that bracing and beautiful region along the shores of the Gulf of Maine, reached by way of the Boston & Maine railroad. The movement has already begun, as well it might, considering the early advent of the heated term; and it begins to look like one of the biggest seasons the seashore resorts of Massachusetts, New Hampshire and Maine have ever experienced.

It would be difficult to add anything to what has already been said about the superb attractions which these cool and wind-kissed resorts have for the overworked or the invalid. Those who would like to read up on this timely and enticing topic are advised to send a 2 cent stamp to the General Passenger Department of the Boston & Maine railroad, Boston, for a copy of the illustrated booklet, "All Along Shore," which contains a condensed description of the whole region.

Fan System for Ventilating and Heating.

The Buffalo Forge Company, Buffalo, N. Y., U. S. A., have recently received an order for a fan system heating and ventilating apparatus to be shipped to Japan. It is to be used at the Imperial Crown Prince Palace, now building in Tokio. The fan is of special design and has an engine of the United States government type, directly attached, for driving it. Each section of the heater is valved separately. The arrangement is such that either live or exhaust steam may be used entirely, or any portion of live or exhaust steam, as may be desired. The design of the Buffalo heater is such as to afford the greatest possible convenience in this respect, which feature won the order at a price one-third higher than all others submitted. This

company at the present time have in course of construction another large order from the Japanese government including pressure blowers for foundry work, etc.

Telephone Installations.

The Social Manufacturing Co., of Woonsocket, R. I., has recently arranged with F. O. Plummer of 620 Atlantic Ave., Boston, for the installation of a private telephone system in their plant. The system will have 16 stations in different portions of the mill, so that they may be in close touch with the office. It is becoming a very general custom for large manufacturing plants to use these private telephone systems, and it seems to us, when the many advantages and economies become fully appreciated, they will become almost as essential as the power plant. Another large concern that has recently installed the Ericsson telephone, handled by Mr. Plummer, is the Fairbanks Scale Co., of St. Johnsbury, Vt., who have put in 26 phones. Mr. Plummer makes a specialty of mill work, and the Ericsson Swedish telephone is acknowledged to be in the front rank.

Curious Bits in the White Mountains.

You may travel this country over, but there is no section more interesting in every sense of the word than is the White Mountain Region of New Hampshire. Every resort within its confines has its own particular wonders or scenic attractions, many of them being strange yet decidedly interesting natural formations. Take, for instance, Elephant's Head in Crawford's Notch,—the rock deposits forming the trunk, head, eye and ear of a gigantic elephant which can be seen for a great distance. Then there is, in the Franconia Region, that most widely known formation, the Profile or Old Man of the Mountain which stands guard over Profile Lake; and not far distant is the great Cannon Rock surmounting the mountain of that name. Down at North Conway is the oddity, White Horse Ledge, and thus you will find in every locality some marked peculiarity that is wonderfully interesting. Mount Pleasant and Fabyans are in the very heart of the mountain region, and a short journey in various directions will bring the tourist to Crawfords, Jefferson, Jackson, Bartlett, Sugar Hill, Bethlehem, Maplewood, Twin Mountain, Profile House, Littleton or Mount Washington, and the view of the Presidential Range from hereabouts is exceptional. Every one visiting the mountain regions should plan to visit the summit of Mount Washington, for besides the ride to the top of the mountain, which is a most sensational experience, there is a continuously changing outlook in every direction. Portland and Old Ocean are often seen on a clear day, while between lay those gems of lakes, Ossipee, Sebago, Moosehead, and many of smaller size sparkling like bits of shining silver. In other directions the eye catches glimpses of Berlin, of Maplewood, and of the mountain peaks for miles around. When on the summit you are by no means confined to the platform surrounding the hotel, for there are a score of places within easy distance worthy of visit. Among them is the Lake of the Clouds, a goodly sized sheet of water, which is ever clear and cold. Then there is the great chasm known as the Gulf of Mexico, and in the Alpine Gardens grows a variety of mountain plants and flowers which for rarity and beauty would be hard to equal; but the most wonderful place of all is Tuckerman's Ravine. Here the snow lies a hundred feet deep, and through it, cut by the waters coursing down the mountain side, is a series of beautiful arches, the spans being of sufficient size to admit a team, could one but reach them. The descent to the ravine is a most perilous one, and only the most experienced mountain climbers ever attempt to visit it. The hotels of the mountains are models of convenience and magnificence, and all visiting the region are assured a pleasant, healthful and profitable sojourn. You, of course, want to know all about the mountains, so send a two-cent stamp to General Passenger Department, Boston & Maine R. R., Boston, for the book, "Mountain Pointers," and with it you will get an excursion book, both of which are replete with information of value to tourists; and for six cents in stamps will be sent a collection of beautiful half-tones entitled "Mountains of New England."

Krout & Fite Mfg. Co.

In announcing the consolidation of their edging department with the Friedberger Mfg. Co., the Krout & Fite Mfg. Co. inform the trade that this will have no effect upon their other business, but will enable them to devote their whole time and attention to the manufacture of tapes, bindings, braids and other narrow fabrics, and that their business in this line will be extended and that they are better prepared than ever to fill all orders entrusted to them, at their new works on Allegheny Avenue and Emerald Street.

Buffalo Firm Secures Deserved Recognition Abroad.

The Buffalo Forge Company has secured the contract for the entire supply of the forges and blowers for use in the temporary machine shops on the Port Arthur section of the Chinese Eastern Railroad.

The order, which was secured through the M. S. Friede Company of New York, calls for 106 forges and 14 blowers.

The Lowell Machine Shop.

The Lowell Machine Shop, Lowell, Mass., is at the present time giving employment to 1750 men, more than at any time in the history of the company, and to do the work required the shop is busy six days a week and on several evenings until 10 o'clock in some parts of the establishment. In this way it is possible to keep abreast of the work, but not to keep up to the orders for machinery. The shop has work for months ahead and the only orders that can be taken must be for delivery a long time in the future.

In 1895 the Lowell shop was reckoned one of the largest machine manufacturing concerns in the State, but since that time, despite the season of low ebb in 1896, the progress has been so great as to increase to a high percentage the output of the foundry.

The greatest increase is yet to come through the splendid addition to the foundry. This addition will be, when completed, a one-story brick structure,

200 feet long, and 80 feet wide, and while there are now about 400 men in the foundry, between 75 and 100 more will be required, making nearly 500 in all.

In 1895 the old foundry was enlarged to give an increase in the melting capacity of 30 per cent. This addition will increase it 32 per cent. more. These two, together with other minor changes are estimated to make the foundry about 100 per cent. larger than in 1895.

A year ago 24 tons a day was melted, and at present it takes 60 tons a day, the capacity of the foundry, to answer the demands.

From these figures it can be readily seen that the larger foundry comes none too soon to meet the requirements of the situation. As soon as finished it will become a part of the great industry of machine making and do its share toward giving Lowell a position as a centre for fine machinery making as well as maintain for the Big Shop its prestige for high class work held in the past.

—The Cling-Surface Mfg. Co. report rapidly increasing sales, not only in this country, but many orders are being received from Australia, European and South American countries, with a fast growing business in Mexico, all seeming to prove that the truth of the oft-repeated phrase "the days of tight belts are over" is having the backing of belt users. A recent letter from the engineer of Brown, Durrell & Co., Boston, voices the general verdict: "Having tried 'cling-surface' on my 12-inch dynamo belt, I have been able to carry full load with 22-inch sag on belt with no perceptible slip. It surpasses my expectations and I can cheerfully recommend it to do all that is claimed for it if directions are followed."

—John H. Douglas has purchased from R. D. Douglas the business of the Columbia Mfg. Co., with the good will and formula which were formerly bought from A. Steinhauser, whose reputation as a sizing manufacturer is well known. The business will be continued under the name of the Columbia Mfg. Co., at 143-151 Pocasset Street, Fall River, Mass.

—A general cotton business with a large capital has recently been started, with principal office at Houston, Texas, and branch office in New York City, by Weld and Neville. The partnership is made up of the following well-known parties: Stephen M. Weld, Charles W. Ide, George W. Neville, S. M. Inman, Walter Hunnewell, Alfred R. Weld, Edward M. Weld, James F. McGowan, Edward V. Cary, and William Amory, 2d. Special capital, to the amount of $400,000, cash, has been paid in.

—The old firm of Samuel Fitch & Sons Co., of Rockville, is now located in its new quarters at Thornton, near Providence. It will be remembered that last spring their property and machinery at Rockville were sold to the J. J. Regan Mfg. Co., and the firm changed its name to Samuel Fitch Mfg. Co., relocating at Thornton with entirely new machinery for knitting and finishing their line of elder downs, fleeces, stockinets, glove linings, etc. They are now running until 9 o'clock at night. Pardon Peckham, Jr., is president, and F. W. Perkins, treasurer, while William Grandage holds his old position as superintendent, with Frank Kohler as boss knitter; George Pilkington, boss dyer, and John Goysila, boss finisher. On August 1st they will commence to build an addition, which will be 100 feet long, 60 feet wide, three stories high, as their present room is too small. Besides that, they will add soon a new boiler and new engine of 150 H. P., coupled with a new water wheel, which will give them the additional power which they need.

—Kilburn, Lincoln & Co., Fall River, Mass., are delivering 500 of their standard pattern high speed looms to the Hargraves Mills, Fall River, Mass., for the addition to the No. 2 mill, which is nearly completed. The same firm is at work on 800 high speed looms for the new Parker Mill in Warren, R. I.

—The Arkwright Mills, Fall River, will add 50 Kilburn, Lincoln & Co.'s heavy pattern looms to their plant, where 1100 looms of this pattern are now in operation.

—Kilburn, Lincoln & Co., Fall River, Mass., have recently delivered an order of their heavy pattern looms to the Conanicut Mills, Fall River.

—Nanz & Company have removed from 116 Chambers Street to 127 Duane Street, corner Church Street, Graham Building, Room 41, New York City.

—The trustees of the Fall River Textile School, Fall River, Mass., are advertising for a site for the textile school, to be erected in that city, to contain not less than 70 square rods.

—The Electric Light & Power Co. of Syracuse, N. Y., are extending their present power house. The extension will be 70 feet wide and 100 feet long; one-story structure, having brick side walls and steel framework. The steel framework is arranged to carry two traveling cranes over their dynamos and engines. The Berlin Iron Bridge Co. of East Berlin, Conn., are given the contract to design, furnish and erect the steel work in this extension.

Pipe and Boiler Coverings.

The advantages of covering pipes and boilers with a non-conducting substance to prevent radiation have been so thoroughly demonstrated that there should be little need of advocating their value, but there are some features which are apt to escape steam users' attention that may be mentioned, and then again the question of the kind of covering is always an important one.

Fuel is burned to make steam or to give heat, and if we do not get the full value of the heat, just so much money is wasted on the fuel. Heat is lost through radiation, and by preventing the radiation, we, of course, are saving fuel. More than that, covered pipes give dry steam, and enable it to be carried to points more or less distant and used where it is needed before it condenses. Many a boiler which is not making steam enough or which requires forcing to furnish the steam needed, could, if covered with a suitable material, do its work comfortably, because all the heat generated would be retained, and one has only to approach a steaming boiler to be aware how much heat is lost through radiation.

Coverings which retain heat are in themselves fire-proof, and it has been noticed that plants where the steam or hot water pipes are covered are seldom damaged by mysterious conflagrations, which usually can be traced from wood or some other combustible material being in contact or becoming heated from uncovered steam pipes. Steam or hot water heating pipes should always be covered to obtain the best results.

The Norristown Covering Co., Ltd., of Norristown, Pa., is a concern which has had an unusually rapid growth, and they naturally attribute it to the excellence of their covering. Starting about four years ago, their business has very rapidly increased, involving corresponding enlargement of their facilities. Their coverings are made of the best non-conducting materials. Different compositions are employed for different purposes. Their high pressure covering is a composition of magnesia, asbestos and the necessary binding materials, making it light in weight, tough and non-combustible. For medium pressure they employ a wool felt covering, lined with layers of asbestos paper, and there are other grades for low pressure and hot water coverings, as well as for cold water pipes. The coverings are sectional, so that they are easily applied. The sections are covered with strong duck sheetings, held by gold lacquered bands, making a neat appearance, and they can be removed without injury and are claimed to be very durable. Where cheapness is the special end sought, they supply a fitting cement, which, however, is not so convenient for use as the sectional covering. Special shapes are made for elbows, tees, valves, crosses, etc., and they are prepared to furnish any fire-proof, non-conducting coverings for any requirements. They refer to a large line of customers, and invite correspondence as to prices, discounts, etc.

New England Cotton Manufacturers' Association.

The fall meeting of this association will be held at Montreal on Thursday and Friday, October 5-6. The headquarters of the association will be at the Windsor Hotel, Montreal, where the sessions will also be held. The provisional arrangements are for those who go from Boston to leave the Northern Union Station on Wednesday morning at 9 a. m. and returning arrive at Boston on Saturday at 7.10 p. m. Those who do not wish to spend so much time on the road can go by night trains both ways, so that they will not be away from Boston but two days. This trip will be under the guidance of Messrs. Raymond & Whitcomb, 296 Washington St., Boston, and the cost of the trip traveling by the day trains will be $28.50. If night trains are used, the cost will be reduced by the difference in hotel charges. The return tickets will be good for twenty days, in order to enable members to extend their stay as may be desired. Passengers from other points than Boston, outside the route to Montreal by way of Lowell, Manchester and Concord, will obtain their tickets independently.

Full particulars will be given in the call which will be issued about a month before the meeting.

MILL NEWS.

Cotton.

New Mills.

—*Alabama, Florence. The new cotton mill here has been chartered as the Ashcroft Cotton Mills, with a capital stock of $50,000. A 2000-spindle mill is proposed to be in operation by March 1, 1900. Cyrus W. Ashcroft is the chief promoter.

—*Alabama, Mobile. The new mill of the Mobile Cotton Mills has been finished and the machinery equipment will probably arrive very soon. M. R. Dunlap is secretary and treasurer.

—*Alabama, Ozark. J. E. Acker expects that $68,000 will be raised for a new cotton mill here to have about 160 looms. It will be a cloth mill; steam power. It will be about a year before production commences.

—*Alabama, Scottsboro. W. Jasper Jackson, mayor, informs us that the town will probably raise $10,000, which it will give as a bonus to parties locating a cotton mill with not less than 5000 spindles. Subscriptions are now being received.

—*Georgia, Americus. J. B. Fielder has obtained subscriptions for $77,000 of capital stock for the new company here, which will have $100,000 capital. First payment on subscriptions will probably be called for September 1 and work started on the building.

—*Georgia, Carrollton. Work on the new Carrollton Cotton Mill will be started about the first of August. The mill will be equipped with 6700 spindles and about 200 plain looms, all of which have been ordered.

—Georgia, Dalton. A new cotton mill is talked of for this place to have 5000 spindles and 120 looms, with a capital of $150,000. It is said that Toledo, O., parties are interested with the Dalton capitalists. T. R. Jones is the party to be addressed.

—*Georgia, Dublin. The new cotton mill to be built here will probably be a $100,000 plant. The committee having project in charge consists of W. F. Schaufele, William Pritchett and F. W. Powell.

—Georgia, Elberton. W. O. Jones and L. M. Heard are endeavoring to establish a new cotton mill company here with $150,000 capital.

—*Georgia, Griffen. The Rushton Cotton Mfg. Co. is the name taken for the most recent cotton mill project here, in which B. R. Blakely and R. T. Daniel are interested. Capital, $125,000. The plant will be located on Lydon Lake, near Griffen; water power.

—*Georgia, Griffin. The following officers have been elected by the stockholders of the new Spaulding County Cotton Mills: President, W. J. Kincaid; vice president, Douglas Boyd; secretary, J. W.

Mangham; treasurer, J. J. Mangham. Work on their new mill will be started at once. The capital stock is $100,000.

—Georgia, Macon. It is expected that the Chamber of Commerce, through its president, George A. Smith, will soon start subscriptions for a co-operative cotton mill for this place.

—*Georgia, Tennille. Last February, Col. T. W. Hardwick and Col. H. N. Franklin, both of Tennille, subscribed $25,000 for a new cotton mill here. It is reported that Macon, Ga., capitalists have agreed to put in $30,000 cash in a new mill here and with some more local capital a new plant with $60,000 capital will be built.

—*Georgia, Valdosta. The new cotton mill has been chartered as the Strickland Cotton Mills, with a capital stock of $150,000.

—Illinois, Chicago. The McCormick Harvesting Machine Co. will build a five-story brick twine factory at a cost of $300,000.

—Indiana, Madison. Richard Johnson, president of the Eagle Cotton Mills of Madison, is reported as now building a mill for making cotton bags at Madison.

—*Louisiana, Mansfield. The new cotton mill here will have $50,000 capital, instead of $30,000, as was originally intended. A committee has been appointed to attend to this project, of which Dr. M. O. Stribling is chairman and R. T. Clifton, secretary.

—*Louisiana, New Orleans. The proposed cotton mill in which John D. Blakemore is interested, will make high grade cotton cloth, employing about 300 hands. Capital stock will be $150,000. August Craft, E. S. Rapier and others are interested. .

—Massachusetts, Westfield. Contract has been let for the new building of the Textile Mfg. Co. to P. J. Mahoney. It will be located on North Elm St., and will be 200 by 45, three stories, brick, to be finished by November 1st. The architect is A. W. Houlton.

—*Mississippi, Okolona. E. S. Elliott informs us that when subscriptions to capital stock of the new cotton mill reach $75,000, a company will be chartered. At present he has received $53,000 of local capital.

—New Hampshire, Manchester. It seems probable that the Stark Mills will build a plant in the South. At the last session of the New Hampshire legislature, permission was granted this corporation to purchase land and erect buildings outside the state. Treasurer Sydney Coolidge and Agent Stephen N. Bourne recently were in the South investigating mill sites and are understood to be now negotiating with the idea of building a plant. Their coarser grades of goods would be made in this Southern mill, using the well-known Stark Mills trademark.

—*New York, Elmira Heights. The Elmira Knitting Mills will operate their new yarn mill under the name of Connewawah Spinning Co. It will have 10,000 spindles; steam power, with a dye house. The president of the company is C. G. Decker; treasurer and superintendent, William H. Bilbrough. The capital stock is $100,000.

—*New York, West Utica. The organization of the Utica Spinning Co., was perfected last week. Capital stock is $275,000. President is Quentin McAdam; vice-president, John W. Allis; and secretary and treasurer, George E. Farrell. A building 300 by 100, three stories, will be put up at once and equipped with about 30,000 spindles for making hosiery yarns.

—*North Carolina, Fayetteville. The new Tolar-Hart & Holt Mills are to be equipped with 6000 spindles, which have been ordered from the Howard & Bullough American Machine Co. They will make hosiery yarn. The building is built to accommodate 12,000 spindles, the balance to be put in later.

—North Carolina, High Point. J. H. Millis is actively interested in the establishment of a new cotton mill here to cost about $100,000.

—*North Carolina, High Shoals. D. A. Tompkins, of Charlotte, who is president of the High Shoals Co., expects to have foundations started on the new building by August 1st and to have the mill running by January 1, 1900. Product will be white cloth. They will have 5000 spindles and 150 looms.

—North Carolina, Louisburg. J. S. Barrow contemplates starting a cotton rope and twine factory and solicits information as to cost and all details for a small plant.

—North Carolina, Marshall. The water power on the French Broad River at this place, which is a few miles west of Asheville, will be developed by a new corporation known as the North Carolina Electric Co., managers of which are Lieut. Gov. Reynolds and E. M. Gibbons. It is proposed to build a cotton mill at this site to use power from the company's plant.

—*North Carolina, Mayodan. The Avalon Mills, recently incorporated here, will be built and put in operation about January 1st, 1900. Product will be yarns. 10,000 spindles. Capital, $150,000. President, F. H. Fries; treasurer, W. C. Ruffin.

—*North Carolina, Raleigh. It is probable that the proposed new cotton mill on the Neuse River will be built. W. W. Vass and C. G. Latta, president of the Raleigh Cotton Mills, recently bought a site which includes a valuable water power and also a building formerly used as a paper mill, which will be remodeled and equipped for cotton manufacturing.

—*North Carolina, Shelby. The new mill company has been incorporated as the Shelby Cotton Mills. H. D. Wilson is president; J. F. Williams, secretary and treasurer, and M. M. Mauney, superintendent and manager. Work on a new building will be started very soon. The plant will cost about $100,000. The product will be yarn and cloth.

—*North Carolina, Wilmington. J. H. Chadbourne, Andrew Smith and others who are interested in the new $100,000 cotton mill here, will let contracts very soon for building and machinery. The plant will probably make plain white goods.

—South Carolina, Anderson. The Orr Cotton Mills, a new company recently organized here with a capital stock of

$400,000, has purchased 10,000 spindles, with other machinery, with which the plant will be started. It is expected to enlarge before long.

—*South Carolina, Florence. The proposed cotton mill here is to have 20,000 spindles; steam power. A committee has been appointed to receive subscriptions for the $200,000 capital stock. It is proposed to make plaids and white goods. The subscription committee includes W. H. Day, W. H. Malloy, W. R. Barringer and others. It is not expected that the plant will be in operation before next summer.

—*South Carolina, Johnston. . .The new cotton mill, of which Alvin Etheridge of Saluda, S. C., is the chief promoter, is to have $60,000 capital. 3000 spindles will be put in and 100 looms, to make sheetings, shirtings and drills. He hopes to start production January 1, 1900.

—*South Carolina, Newberry. The Anchor Cotton Mill is the name taken by a new company which has been organized with a capital of $250,000. James McIntosh, C. T. Poole and C. J. Purcell are interested. A 10,000 spindle mill is contemplated.

—Tennessee, Oregon. A $20,000 cotton mill company will be incorporated here by J. M. Moyers and H. B. Warren of Oregon, J. J. Hooker of Cincinnati, and J. D. Kennedy, formerly superintendent of the West Huntsville Cotton Mills. The plant formerly operated by the Warren Mfg. Co., which was recently sold under decree of the court, will be used. .

—*South Carolina, Orangeburg. The stockholders of the Enterprise Cotton Mills, whose plant has not yet been equipped with machinery, have now voted to increase the capital stock to $200,000, issuing common stock. They have made propositions during the past few months to issue bonds and preferred stock, which are now cancelled by this new arrangement. It is hoped that they will have machinery placed and running by next January.

—*Texas, Barker. Machinery for the Meadowbrook Cotton Mills Co., F. W. Smith, president, has now arrived and will be put in and started as soon as possible.

—Virginia, Norfolk. The Fidelity International Co., of Philadelphia, has bought 14 acres here and will build a cotton yarn mill. J. S. Coghran, general manager of the company, has the matter in charge. Contract will be let to George C. Deitrick of Philadelphia. The building will be 46 by 200. The officers of this company are: President, James Pollock; vice-president, Israel W. Durham; treasurer, C. A. Furbush; and secretary, E. W. Watson. A cottonseed oil mill will probably be built adjoining the cotton mill. Both plants will cost about $200,000.

Enlargements and Improvements.

—*Alabama, Eufaula. Several months ago it was reported that the Eufaula Cotton Mills would largely increase their capacity. The directors have now decided to put in a new steam plant, which will be much larger than the old, which is taken as an indication that the plant will be enlarged before long.

—Alabama, Eufaula. The Chewalla Cotton Mills at this place, at present operating 3328 spindles, propose to issue bonds to the amount of $50,000 for doubling their capacity. J. P. Joy is president.

—Alabama, Mobile. The Mobile Cotton Mills, whose plant has been running since October, 1898, will put up a new building to provide for 5000 spindles. The product will be cotton yarns from 8's to 20's. They have a capital stock of $100,000. The president is J. T. Dumas; treasurer, M. J. Dunlap.

—Georgia, Columbus. The Eagle & Phoenix Mills have decided to increase their capital stock from $600,000 to $750,000. The present stockholders will be allowed 25 per cent. of their present holdings, thus being given the first opportunity to buy new stock. Three hundred new looms will be put in.

—Georgia, LaGrange. The stockholders of the Dixie Cotton Mills, at their annual meeting held July 1st, voted to issue $250,000 in consolidated first mortgage, 30 year, 6 per cent. gold bonds. This issue is to take up the outstanding 7 per cent. bonds, and will also provide $100,000 for new machinery. The trustees are the LaGrange Banking & Trust Co. It is understood that machinery has already been ordered which will give the mills an equipment of 20,000 spindles and 375 looms.

—*Georgia, Monroe. At the annual stockholders' meeting, July 15th, of the Monroe Cotton Mills, the old officers were re-elected, and the president was directed to sell new stock sufficient to double the capacity of the mill, which now has 5200 spindles and 314 looms.

—Georgia, Raccoon Mills. The Raccoon Mfg. Co. are considering enlarging their plant. They now have 3400 spindles and 104 looms. Their product is sheetings, shirtings and drills. The president is John S. Cleghorn; treasurer, J. M. Wyatt.

—New Hampshire, Dover. The Cocheco Mfg. Co. is to put up a three-story building, 100 feet square, of brick, to be used in connection with their print works. This is to be located on the site of the building recently torn down.

—*New Hampshire, Manchester. The Manchester Mills have had work started by Contractors Head & Dowst on a new building, about 400x55, which will be used as a print works and chemical department.

—New York, Lockport. The Lockport Cotton Batting Co. intend putting up three new buildings at Mulberry St. Two will be 180x40 and one will be somewhat smaller. Their plant is at present located at 247 Market St. Benjamin Len has the building contract.

—North Carolina, Asheville. The Asheville Cotton Mills will have new machinery put into their carding room and elsewhere, which will bring about half their equipment up to date. It is expected that later on the entire mill will be refitted. They operate 8500 spindles and 420 looms on ginghams.

—North Carolina, Concord. The Cannon Mfg. Co. have started work on foundations for their new building, which, with machinery, will cost about $100,000. 6000 spindles and 300 looms will be put in.

—North Carolina, Cumberland. The Cumberland Cotton Mills are now being equipped with new machinery, the old having been removed. 2538 new spindles and other machinery will be put in to produce cotton yarns from 8's to 12's. James B. Driver, of Hope Mill No. 1, will have charge.

—North Carolina, Elizabeth City. Work has been started on an addition to the Elizabeth City Cotton Mills, now operating 5,000 spindles on warp yarns. President is O. McMullan; treasurer, James G. Gregory, and superintendent, H. F. Smith.

—North Carolina, Franklinville. The Franklinville Manufacturing Co., who were reported several months ago as to enlarge, are building a new mill 40 by 80, three stories, adjoining their present plant. This building will be equipped with bag weaving machinery. They now operate 128 looms.

—North Carolina, Gastonia. The Trenton Cotton Mills have now ordered additional equipment, which will consist of 4000 spindles. At present they operate 3000 spindles.

—*North Carolina, Greensboro. The addition to the Hucomuga Mfg. Co., mentioned last April as to be built, has now been started. It will be 53x45, one story and basement, and will provide for 45 more looms, giving them 144 looms. The product is chambrays and fancy shirtings.

—*North Carolina, Henrietta. The Henrietta Mill No. 2 will put in 14,000 new spindles, which have been ordered. The equipment now consists of 56,640 spindles. This enlargement will cost about $150,000. There is room for this equipment in their present building.

—*North Carolina, Mayodan. The Mayo Cotton Mills state that 8,000 new spindles will be put into the addition which they are now building.

—North Carolina, Waxhaw. The Rodman & Heath Cotton Mill expects to expend about $35,00 on improvements. They will probably add 2500 new spindles, which will double their equipment.

—*South Carolina, Abbeville. B. F. Bailey, president of the Abbeville Cotton Mills, desires to put in machinery, for which there is room in their present building. He desires to add 3000 or 4000 spindles and 250 looms. They now operate 696 Northrop-Draper looms.

—*South Carolina, Chester. The Springsteine Cotton Mills is the company which recently bought the old gingham mill here and is now operating it with 435 looms. They now propose to build a new building, putting in 7000 spindles for making yarn. Contract for machinery and building has been placed. This enlargement will cost about $100,000.

—South Carolina, Clio. The Red Bluff Mills, now operating 5000 spindles, desire to double their equipment, and would like to interest outside capital.

—South Carolina, Clover. The Clover Cotton Mfg. Co., have ordered combing machines and expect to make No. 40's combed hosiery yarn from Egyptian cotton.

—South Carolina, Gaffney. The capital stock of the Gaffney Cotton Mills has been increased from $700,000 to $800,000, and 10,000 new spindles will be put in. At present they operate 51,000 spinning spindles and 5000 twisting spindles.

—South Carolina, Greenville. The Huguenot Mills have just completed a handsome mill office building, also a new cloth room and an addition to the main building, where 2000 new spindles will be put in and 70 looms.

—South Carolina, Reedy River Factory. The Reedy River Cotton Mills are putting up a new picker room and will also add new carding, spinning and cloth room machinery and 115 looms.

—Texas, Cuero. The plant of the Excelsior Mfg. Co., which has been shut down for three years, will be enlarged to double its present capacity. The capital stock of the company will be increased to $100,000, and it is expected that the plant will be started as soon as new machinery is received. At present it has 1224 spindles and 40 looms, and has made duck, knitting yarns and sheetings. C. L. Studler is president and E. Mugge, Jr. treasurer.

—Virginia, Petersburg. The Blue Ridge Mfg. Co., now operating 107 looms on cotton goods, will put in 50 new box looms, with dobbies, and go on to fancy cottons.

—Virginia, Petersburg. The Pocahontas Cotton Mills will build an addition 30 ft. long to their main building and also put up a new bulding 45 by 60, three stories, to provide for new machinery.

Mills Starting Up.

—*Connecticut, East Killingly. Quite extensive improvements will be made to the Chestnut Hill Mill, which will be operated by A. G. Bishop of New York, who recently bought the mill and other property for $9000. The plant includes 6000 spindles and 104 40 in. looms and employs about 00 hands when running full.

—*Massachusetts, Worcester. The Worcester Thread Co., now starting up, will be under the management of William Forsyth. Charles Whitehead will be overseer of the weaving department, and George Phillips, who has been foreman of spooling and dressing at the Warren Thead Co.'s mill will take this department in Worcester. Floyd Cranska, thread manufacturer at Moosup, Conn., is interested in this concern, which is outside the combination.

—*North Carolina, Lincolnton. The Indian Creek Mills Co., which was originally incorporated last year with $30,000 capital, now has its building erected, but the equipment is not yet bought. Additional capital has been subscribed and 2500 spindles will be put in. The plant will soon be running.

—*South Carolina, Orangeburg. If the present arrangement of the Enterprise Cotton Mills succeeds, they expect to place contracts for equipment in a few weeks' time. This will include 10,000 spindles, 350 looms and other equipment for making medium grade sheetings for export. The hope is to issue $200,000 capital stock. T. C. Duncan is the president; B. H. Moss, treasurer, and Arthur Whittam, agent.

—Tennessee, Bristol. J. M. Fulton and Capt. McNeill have purchased the Sparger Cotton Mill for $10,000, and it is understood that they will put same in operation soon.

—*Tennessee, Chattanooga. The Vance Cotton Mill Co. will start up its building, near the corner of Montgomery and Rossville Aves., within a few days. This plant has been idle for many years, and has recently been thoroughly overhauled and refitted. At present, it is equipped with only 1000 spindles. It is expected to double its equipment soon, however.

Woolen.

New Mills.

—Illinois, Chicago. Henry Faurot, until recently with Armour & Co. of Chicago, as manager of their felt business, is building a new felt mill, which will be known as the Western Felt Works, 787-797 South Canal St., Chicago. Machinery has been purchased and will soon arrive. Ten cards will be put in. John Pendergast will be superintendent and Leon Silverman, lately head salesman for Armour Felt Works, will be head salesman for the new firm.

—Illinois, Chicago. There is a report that a large textile mill is to be built in or near Chicago. Archt. Paul Gerhardt has prepared preliminary drawings and foreign capitalists are said to have secured options on several 40-acre tracts of land. These are Germans. The plant considered will cost about $300,000, and will include several buildings. Probably production will be men's wear, woolens and worsteds.

—*Illinois, Lacon. The Lacon Rug Co., Roy L. Blackstone proprietor, operates four looms. This is the new concern recently mentioned. The plant was started about June 1st, employing 10 hands. They made rugs from old carpets.

—Maine, Houlton. Estey & Trueworthy will start a small plant here for making Canadian homespun and other woolen fabrics.

—Maine, Skowhegan. Edward Gledhill and Herbert Wentworth will probably lease the brick building known as the Burrell Mill here and equip and operate same on worsteds. 16 looms will be put in. The yarn will be bought. They have about $10,000 capital and hope to interest $5000 more. Mr. Gledhill is a designer and manufacturer of long experience, having recently been with Lewis Anderson & Co. Mr. Wentworth was formerly of the Wentworth & Oak Furniture Co.

—Massachusetts, Chicopee. The Burtworth Carpet Co., now located at 48 Hampden St., Springfield, will remove to Chicopee. Several locations are being considered. When the change is made, it is expected that the capacity of the plant will be doubled. They make Wilton rugs.

—North Carolina, Greensboro. The Van Devanter Carpet Co., now located at Plainville, N. J., will put up a building here, 50 by 100, two stories, and move its equipment from Plainville. There it has 35 looms, amking ingrain carpets and art squares. A. J. Brunson is president. About $50,000 will be put into the plant here.

—Ontario, Brantford. A new woolen mill is under construction here, capital stock to be $95,000, which has been largely subscribed by local parties. F. Grabb, G. W. Brohman, Dr. Hart and others are mentioned.

—Pennsylvania, Philadelphia. Scheck & Goodman will start a new carpet plant at Howard and Palmer Sts., about Aug. 10th. It will have 15 looms and the machinery throughout will be new, making damask and Venetian stair and ingrain carpets. These parties were formerly with James Pollock & Son, carpet manufacturers in the Dauphin Mills, Philadelphia.

Enlargements and Improvements.

—Connecticut, Vernon. The Vernon Woolen Co. will build a new mill just west of the old. Contract has been awarded to W. J. Driggs of East Hartford; work to be completed by November 1. This new mill will be larger than the old. The building is to be 50 by 64, four stories. Equipment will include 20 broad looms, five sets of cards, five mules and finishing machinery. A new 225 H. P. engine and two boilers have been bought.

—Georgia, Atlanta. Work was started July 15th on the foundation for the addition to the Atlanta Woolen Mills. The building is to be four stories, 80 by 150. When this addition is equipped with machinery, the company will have eight sets of cards, 300 looms. The management may place some fancy looms and wet finishing machinery in the new building. They will also put in equipment for making their own cotton warp.

—*Massachusetts, North Adams. Regarding the addition to the plant of the North Adams Mfg. Co., E. B. Penniman, treasurer, informs us that they propose to add to their main building an extension of about 90 feet, four stories, but have no present intention of any important increase in machinery.

—*Massachusetts, North Andover. The Brightwood Mfg. Co. will rebuild the mill which was recently burned, giving them the same capacity as formerly.

—New York, Jamestown. William Broadhead & Sons, worsted manufacturers, are making extensive improvements. A new boiler house for six large boilers, is being built, also a wool warehouse and an addition to the dyehouse, which will be used for carding. Worsted yarn spinning machinery is being put into the Lister Mill. Two sets of worsted machinery have already been set up and more is expected soon.

—Pennsylvania, Jersey Shore. The Leinbach Woolen Co., a plant with three sets of cards and thirteen looms, located at Antes Fort, Pa., is considering removing to this place. The principal stockholders in this company are William L. Youngman, John S. Leinbach and William Leinbach. It is probable that the plant will be enlarged and capitalized at $100,000.

—Pennsylvania, Philadelphia. John & James Dobson are to put up a new building at Godfrey St. and Stenton Ave., 50 by 150, four stories. The plant will make men's wear worsteds.

—Rhode Island, Centreville. The Kent Mfg. Co. is breaking ground for a new weave shop.

—Rhode Island, Harrisville. William Tinkham & Co. are building an addition to their woolen mill, 100 by 50, brick, to be used as a finishing department.

—Rhode Island, Woonsocket. A two-story addition will be built to the Perseverance Worsted Co.'s plant, which will be 60 by 50. This enlargement will be used for a finishing department and stock room.

Mills Starting Up.

—*Alabama, Anniston. The Anniston Carpet Co., organized here several months ago, expects to put its plant in operation within a few weeks. James Buckler will be general manager.

—Connecticut, Danielson. The Elmville Woolen Mill, owned by C. D &. C. S. Chase, which has been closed for more than a year, has been started up. It is a four-set mill making fancy cassimeres.

—*Illinois, Charleston. The Charleston Woolen Mfg. Co. is the name taken by L. R. Schmalhausen and W. E. Stoddert, who are to use the building formerly occupied by the Weiss Woolen Co. They will put in entirely new machinery —two sets of 60-inch cards, 10 broad and 5 narrow looms. They expect to start up November 1st, 1899, employing 50 hands, making men's wear—cheviots, twills, diagonals and maltai mixes. J. S. Fildes will be superintendent; Walter Fieldhouse, 916 Medinah Temple, Chicago and S. A. Aaron, St. Louis, selling agents.

—Maine, Gardiner. The woolen mill recently operated by the Perseverance Woolen Co. has been leased by W. S. Arnold, who will start up the plant in a small way at first, with the expectation of running in full soon.

—Maine, Limerick Mills. The Limerick Mfg. Co. is a new corporation here with a capital of $30,000, to manufacture textiles. The incorporators are S. O. Clark, C. H. Adams and C. A. Moulton of Limerick, and A. Garner and J. M. Lord of Parsonfield.

—*Massachusetts, Worcester. John R. Scott, of Uxbridge, who has leased the Piedmont Mill for five years, has started machinery in same. This is located at 87 Water St. The building was formerly occupied by the Hopeville Mfg. Co. Mr. Scott will make overcoatings, cloakings and suitings, employing about 50 hands when running full.

—*Michigan, Sault Ste. Marie. The Soo Woolen Mills, owned by Griffith & Cullis, have started up, having been shut down since the first of March. Improvements have been made at the plant.

—*New Hampshire, Windham. Hollings & Smith have already started weaving dress goods on commission in the Golden Brook Mill here. They have 21 looms and are at present weaving dress goods on commission. They also make ladies' worsted dress goods and tape banding for spinning.

—New York, Skaneateles Falls. The Ayershire Woolen Mills, which have been shut down for seven months, are now being started up.

—Rhode Island, Ashaway. The Bethel Worsted Mills, which have been idle for some time, are understood to have been leased by Henry Kissell of the firm of Haho & Co., 50 White St., New York City. The property was held by the Peoples' Savings Bank of Pawcatuck. He is expected to start the plant immediately.

Mills Shutting Down.

—Massachusetts, Lowell. The Middlesex Co. has closed down its mill No 3. for an indefinite time.

—Massachusetts, Lawrence. It is announced that the American Woolen Co. will shut down the Washington Mills for about six weeks.

—Massachusetts, Northboro. The Woodside Mills, W. F. Wood & Co., proprietors, manufacturers of blankets, have been shut down for an indefinite time. This puts about 300 hands out of work.

—Massachusetts, Ware. C. A. Stevens & Co., woolen manufacturers, will shut down their mill July 29th, and not start it again until Monday, September 4th. Last year their plant was closed during August.

Knit.

New Mills.

—Alabama, Huntsville. The Chamber of Commerce has received a proposition from a New York Knitting manufacturer to locate a $50,000 plant here, if $20,000 in bonds and $20,000 in stock will be taken by Huntsville people. A committee has been appointed to follow the matter up, consisting of N. K. White, J. R. Boyd, R. F. Pettus, Oscar Goldsmith and T. H. Pratt.

—Georgia, Americus. W. T. Lane was recently mentioned as endeavoring to establish a new cotton mill here. Now it is proposed to build a new knitting mill, instead of a cotton mill.

—Georgia, Fitzgerald. D. Holmes, one of the interested parties in the proposed knitting mill here, informs us that particulars of this plant have not yet been decided upon, but that conditions are favorable to its being built.

—*Maryland, Cambridge. The project of establishing a new knitting mill at this place which was considered last February was dropped at that time owing to the death of one of the interested parties. Edgar B. Simmons has now taken the matter up and expects to have a new building equipped with machinery and running about October, 1899, on fine grade hosiery and probably underwear. About $10,000 will be put in.

—Missouri, St. Louis. The Criterion Hosiery Mills is a new plant which will start about August 1st on men's fine gauge cotton hose with about 176 needles. They will have 10 knitting machines, steam power, with dyeing facilities. E. Dreidel is proprietor; P. F. Vogel, manager. The plant is located at 212-214 Spruce St. Mr. Dreidel expects to increase to about 25 machines soon.

—New York, Herkimer. Quackenbush & Pickerd have leased the old Quackenbush gun shop on Prospect St., and have started up a small seamless hosiery plant. They have four McClure knitting machines, one ribber and one looper. Their production is 25 to 30 dozen per day of cotton and woolen hosiery. They use steam power and have a dyeing depart-

ment. The firm consists of George Quackenbush and W. I. Pickerd, who were both formerly employed at the Rockton Knitting Mill, Little Falls, N. Y.

—*New York, Warsaw. The building of the new Warsaw Knitting Mills is progressing rapidly, and it is now probable that the mill will be ready to start up October 1st. L. H. Humphrey is president; William P. Rumbold, secretary and William Watson, treasurer. The building is 400 by 100.

—Ohio, Cincinnati. The Teutonic Hosiery Co. has been incorporated with $10,000 capital.. The incorporators are Gustav Keller, Sabine L. McHugh, Joseph M. McHugh.

—*Pennsylvania, Mifflintown. The new hosiery mill here will soon be ready to start up. The building is 60 by 25, with an annex, 20 by 25. Equipment includes 72 knitting machines, which are now being put in. The capacity will be about 350 dozen pairs per day. They will employ 50 hands. The proprietors are Karl & E. T. Chell of Nicetown.

—*Pennsylvania, Newville. We hear from the Newville Knitting Co. that work will be started immediately on foundations for their new mill, one of their mills having burned June 23d. This will be a new mill for both plants, to employ about 300 hands on hosiery and underwear. There will be a total of 175 knitting machines. This company has a capital of $80,000. The president is W. C. Woodburn; treasurer, W. C. Brewster; superintendent, J. W. Sharpe.

—Pennsylvania, Reading. The East Penn Hosiery Co. has been organized here with $50,000 capital stock. President, Adam B. Reiser; secretary and treasurer, Oscar B. Wetherold; general manager, William J. Caldwell.

—Pennsylvania, Wayne. The Radnor Hosiery Mills, Ltd., have started work on their new building and expect soon to have equipment in running order. They will employ only about eight hands, and have six knitting machines on men's half hose and infants' hose. They have about $2500 in the business. The president is J. Frazier Bard and treasurer, Thomas Chelfant.

—Tennessee, Chattanooga. Adolph Mathis, corner of Ninth and Broad Sts., Chattanooga, informs us that he, with some friends, intend to establish a plant for making cotton underwear of medium grade. They are not practical manufacturers, and would like to associate with them a skilled manufacturer and put up a plant costing about $30,000, three-fourths of which amount can be raised at once; product to be about 700 dozen per day.

Enlargements and Improvements.

—*New York, Albany. Fuld & Hatch inform us that they expect to remove into their new building about November 1st. They will put in 30 new knitting machines, giving them a total of 90. They will have a dye house and use steam power. Product will be men's, ladies' and children's ribbed underwear, cotton and wool.

—New York, Cohoes. The John S. Murphy Mfg. Co. will put in carding and spinning machinery, which they expect to have in operation by September 1st. The plant is now running on ribbed underwear.

—New York, Cohoes. The Continental Knitting Mills Co. has increased its capital stock from $10,500 to $20,000. It now operates four sets, with knitting machines on underwear.

—*New York, Little Falls. Rugene Walrath informs us that he expects to be located in his new building about September 1st. He does not expect to increase his capacity. He now employs about 125 hands, has 24 cylinder knitting machines, and makes men's and boys' balbriggan light weight and fleece-lined underwear; water power.

—Pennsylvania, Clifton Heights. Crawford & Quinn, proprietors of the Columbus Knitting Works at this place, have purchased a new building and will move their plant into it.

—Rhode Island, Thornton. The Samuel Fitch Mfg. Co., which recently removed from Rockville, Conn., to Thornton, will, on August 1st, commence an addition, 100 by 60, three stories high, to give them additional room. They have recently placed orders for a new boiler and engine of 150 H. P., and a new water wheel will also be installed.

—*South Carolina, Union. The Excelsior Knitting Mills are putting in 5000 spindles for making their own hosiery yarns. They will also add a finishing department. This enlargement was mentioned several months ago.

Mills Starting Up.

—Massachusetts, Millbury. The Portsmouth Mills Co., knitting manufacturers, whose plant has been idle for about six months, will be started about August 1st. The product is knit underwear and knitted silk goods. They will employ about 100 hands.

—*New Hampshire, Laconia. E. S. Tilton has started the Belknap Mill on hosiery, employing about 75 hands.

—*New York, Amsterdam. The Spartan Knitting Mill, recently operated by John & W. A. Liddle, has been sold at foreclosure to Hon. John K. Stewart. This property had incumbrances of about $15,000. It is expected that the plant will be put in operation under new management soon.

—New York, Rexleigh. The Marble Knitting Mills, George E. Brockway, proprietor, have started up after being idle for several months.

—Pennsylvania, West Chester. The West Chester Knitting Co. will be operated by new owners, who are expected to enlarge the plant and start same very soon.

—Pennsylvania, York. The York Knitting Mill, which has been closed since July 1st, started up Monday, July 24th. Some improvements and repairs have been made.

Silk.

New Mills.

—*Maryland, Ilchester. The Thistle Mills Co., which has let contract this week for a separate new building, which they expect to occupy by next October or November, will equip same for making broad silks; putting in 200 looms, which

have been ordered. This will give employment to about 140 more hands and will give them a total of 444 looms, including both cotton and silk. This company has $120,000 capital. President and treasurer, S. F. Patterson; superintendent, R. P. Deal. They use water power.

—*New Jersey, Paterson. The Beaver Velvet Co., recently incorporated with $50,000 capital, will start manufacturing by August 1st in the new Hall Mill. The product will be silk velvets. They will operate 25 new Tonar looms; steam power. The interested parties are Conrad Feldmann, John Hallbach and William Stock.

—*New Jersey, Paterson. Shaw & Barbour, a new firm which is to start a silk weaving plant, inform us that their intention is to put in 25 new Knowles looms, but start will be made with 12, for making taffetas for dress goods, fine quality only. The looms will probably be running by August 10. Their product will be sold through Fleitmann & Co, of New York.

—*New Jersey, Phillipsburg. Illg & Coene are shipping machinery to their new mill here from their plant in Paterson, which included 70 looms. They have made tie and dress silks. Their building at Phillipsburg will have to be enlarged.

—New York, Glendale. The William Wick Co. is to build a two-story silk mill, 50 by 240, on Flushing Ave., at a cost of about $50,000.

—*New York, Fort Hunter. The Victor Rug Mill, which we reported last week had changed hands, will be started up about September 1st by Dexter & Co., Ltd., a new concern to operate this plant, in which W. C. J. Dexter, of Fultonville, N. Y., is chiefly interested. They will make silk novelties, silk linings for kid gloves being their speciality. Some of the equipment has not yet been bought.

—*New York, Oneonta. E. H. Rosenheim, president of the Paragon Silk Co., Paterson, N. J., informs us that his company expects to start operations in their new plant at Oneonta next week, having remodeled the building to suit their purposes. The mill will be conducted as an annex to their Paterson mills, which at the present time they are enlarging.

—*Pennsylvania, Pittston. The Sterling Silk Co., of Paterson, N. J., has accepted the town's offer of a site here, and a $30,000 building will doubtless be started at once, with the agreement that the plant shall be in operation within a year.

—Pennsylvania, Scranton. The Klotz Silk Co., now operating a mill at Carbondale, Pa., and also a small annex in this city, will probably build a large mill here in what is known as the Pine Brook section. Plans have been made by Contractor L. C. Holden. The mill will employ 400 hands. John T. Richards and John A. Mears are interested in this mill with the Klotz Silk Co., and a new corporation may be organized to operate it.

Enlargements and Improvements.

—Connecticut, Stonington. A Wimpfheimer & Bros., proprietors of the American Velvet Co., operating 60 looms here in a building owned by the Stonington Building Co., desire that their building be doubled in size so that they can increase their plant. It is probable that the building company will do this

Mills Starting Up.

—*Delaware, Wilmington. John Hand & Sons, of Paterson, N. J., confirm our recent report that they are to operate a mill here. The product will be thrown silks and dress silks. They will have 200 looms. We understand that the plant will be started at once.

Fires.

—Connecticut, East Lyme. The mill at this place owned by A. R. Darrow and known as the Tabor Rock Mill, was destroyed by fire July 5th. The loss was about $10,000. The product of the mill was cotton twines and rope, lamp wicking, etc.

—Maryland, Alberton. The Alberton Cotton Mills, James S. Gary & Son, proprietors, were damaged by fire July 3rd. The loss will amount to several thousand dollars, mostly on raw cotton.

—Massachusetts, North Andover. The towel and yarn mill of the Brightwood Mfg. Co. was damaged by fire June 30th to the extent of about $2200.

—Michigan, Grand Rapids. The small knitting plant of H. Hensen, located in the rear of 194 Cass Ave., was almost destroyed by fire July 1st. Loss is about $1500, and insurance $1300.

—New York, Troy. The carding department of the Commercial Knitting Co. was damaged by fire on July 18th. The loss on stock and machinery was about $2000.

—Pennsylvania, Germantown. The building in which the Leicester Mills Co. and the Continental Knitting Co. are located was damaged by fire July 5th with a loss of about $25,000.

—Pennsylvania, Philadelphia. The tapestry mill of George Brooks & Sons, 54th and Wyalusing Ave., was damaged by fire July 13th. The loss was about $2500, mostly by water. The fire started in the stock room during the noon hour. This is remote from the engine room and any electric wires, and the cause is thought to be incendiary. The mill was damaged about a week ago by an unaccountable fire.

Facts and Gossip.

—Connecticut, Stafford. It is reported that the Phoenix Woolen Co., operated by E. C. Pinney & Sons, has bought the plant of the Riverside Woolen Co., of which Cyril Johnson is president and Richard G. Beebe treasurer. The transfer is to take place August 1st.

—*Georgia, Athens. W. D. Griffeth, receiver of the Starr Thread Mills, sold the property at auction July 20th for $56,-200. It was bought by Capt. James White. The mill has a capacity for 10,000 spindles, but it now contains only 6200, 30 new looms and other machinery.

—Georgia, Cordele. Maj. J. F. Hanson, president and manager of the Cordele Cotton Mills, is expected to sell his interest, with other stockholders, to new owners, who will enlarge the mill. At present it has 3600 spindles, making yarns.

—*Georgia, Douglasville. The Great Western Cotton Mills, Col. J. S. James, president, have now nearly finished their building and machinery will be put in very soon. The plant will have 20,000 spindles and 500 looms. Probably production will start October 1st.

—Georgia, Hartwell. At the annual meeting of the stockholders of the Hartwell Cotton Mills last week, it was voted to sell the mill at the earliest opportunity. This plant was built six years ago, has a capital of $60,000, and the equipment consists of 3000 spindles and 102 looms. The product has been sheetings. J. D. Matheson is president and treasurer, J. H. Hodges, secretary, and W. S. Harbin, superintendent.

—Georgia, Palmetto. The controlling interest in the Palmetto Cotton Mills has passed into new hands, and the company has been entirely re-organized. The following officers have been elected: J. K. P. Carleton, president; H. L. Johnston, vice-president; O. S. Causey, general manager; F. R. Smith, secretary and treasurer; C. H. Robertson, superintendent. A dividend of 6 per cent on capital stock was declared payable Aug. 1st.

—*Georgia, Poulan. Robert E. Storrs has been appointed receiver of the new Aberdeen Mills, which expected to secure equipment this month. A petition was made by William S. Watson and other stockholders against John G. McPhaul, J. H. Tipton, T. L. Kitchings, J. A. Kitchings and J. F. Wilson, who are also stockholders. It is alleged that Mr. McPhaul agreed to give a deed of trust to the company for a building and site in exchange for his interest in the company, but that he has not done so.

—Louisiana, Washington. The Henrietta Cotton Mills will be sold on July 19th under foreclosure proceedings, at Opelousas, La. The property includes building and entire equipment consisting of a 100 H. P. steam plant, 2500 spinning spindles, 1200 twister spindles, 20 cards and other machinery for spinning yarns, 4's to 14's.

—*Louisiana, Washington. The Henrietta Cotton Mills were sold at public auction July 19th. The purchaser was Geo. N. Fitzhugh of New Iberia. Price was $9475. It is understood that the plant will be enlarged and started up.

—Massachusetts, North Grafton. The Finlayson, Bousfield Co., Ltd., have joined the thread trust. The mills are running as usual, employing about 500 hands.

—*Massachusetts, Dalton. Thomas J. Kernan has been appointed trustee for the creditors of the insolvent Windsor Falls Woolen Co. Claims amounting to $6000 have been presented and approved. The next meeting of the creditors will be held September 6th.

—*Massachusetts, Lee. The stock and machinery of the Lee Woolen Co. was sold at auction in small lots on July 17th.

—Michigan, Grand Rapids. The Simmons Knitting Co. has been incorporated with a capital of $50,000, of which $6000 is paid in. The stockholders are John W. Simmons, 300 shares; W. L. White, 100 shares; W. E. White, 100, and A. F. Marshall, 100.

PERSONAL RECORD.

Cotton.

—O. B. Truesdell, who has been agent and superintendent of the Fiskdale Mills, Fiskdale, Mass., for the past 13 years, has tendered his resignation to the company. He intends to take a much needed rest, and later may probably go into the mill business.

—Enoch Shaw has resigned as overseer of the weaving department of the Newmarket (N. H.) Mfg. Co. Overseer Frank Nichols of the cloth and silk rooms will take charge of the weaving.

—Fred Sharpe, formerly with the Otis Co., Ware, Mass., is now with the Warren Cotton Mill, West Warren, Mass.

—Theo. St. George has been employed as boss carder by Talcott Bros., Talcottville, Conn.

—Richard F. Smith, overseer of mule spinning in the Granite Mills, Fall River, Mass., for eighteen years, has resigned. Mr. Smith's place at the mill has been taken by his youngest son, William R., who has been his secondhand for the last fifteen years.

—Daniel Macduff, formerly of the firm of Whitney & Macduff of the West End Flax Mills, Milibury, Mass., has gone to Ireland, where he will be superintendent of a large thread mill located near Belfast, Ire., owned by the Linen Thread Co. of America.

—Charles Brown, for the last nine years an overseer in the Cable Flax Mills, Schaghticoke, N. Y., has resigned and gone to New York City.

—C. J. Smith of Caroleen, N. C., has accepted the position of overseer of carding at the Cherokee Falls Mfg. Co., Blacksburg, S. C.

—George F. Shipp, formerly of Cottondale, Ala., and Augusta, Ga., is engaged as overseer of weaving in the Fairfield Cotton Mills at Winnsboro, S. C.

—John Schofield, formerly at Enoree, S. C., has accepted the superinntendency of the Camden Cotton Mills, Camden, S. C.

—John R. Rostrom has been appointed overseer of the carding room of the Lancaster Mills, Clinton, Mass.

—John Richardson has resigned the position of overseer of mule rooms Nos. 1 and 2 in the Wamsutta Mill, New Bedford, to become secondhand in the Grinnell Mill. He was surprised by a visit to his home on Austin St., July 22d, of about 25 of his former employees, who presented him with a combination writing desk.

—Frederick W. Reynolds, formerly overseer in the carding room at the Potomska Mills, New Bedford, Mass., has been appointed acting superintendent of the mills.

—A. J. Parker, boss weaver at the Dana Warp Mill, Westbrook, Me., has tendered his resignation.

—B. F. Pearce, recently at Camden, S. C., has accepted a position as overseer of the cloth room at the Warren Mfg. Co., Warrenville, S. C.

—S. C. Phillips, formerly at Victory Mills, N. Y., has accepted a position as overseer of spinning for the Naumkeag Steam Cotton Co., Salem, Mass.

—William Pickard, son of Superintendent J. O. Pickard, has succeeded Milton A. Ellington as overseer of weaving at the Plaidville Mfg. Co., Randleman, N. C.

—John Nightingale, overseer of mule spinning in the Osborn Mills, Fall River, Mass., has resigned.

—Thomas E. Mitchell, of Mobile, Ala., has accepted the superintendency of the Vesta Cotton Mills, Charleston, S. C.

—John L. McKemmie, overseer of carding at the Merrick Thread Co., Holyoke, Mass., has resigned after 27 year's service. The employees under him presented him a silver service and watch charm.

—E. D. McCullum, late of Asheville, N. C., has accepted the position of overseer of weaving at one of the Odell Mills, Concord, N. C.

—Edward Miller, recently at New Bedford, Mass., has become overseer of the mule room of the Osborn Mill, Fall River.

—W. E. Laurey has been appointed overseer of the cloth room of the Camden Cotton Mill, Camden, S. C., succeeding B. F. Pearce.

—James J. Lee, formerly of Fall River, Mass., is now engaged as overseer of weaving, spooling, drawing, slashing and warping in the mill of the Cherokee Falls Mfg. Co., Blacksburg, S. C.

—L. H. Lefoy has engaged with the Fountain Inn Mfg. Co., Fountain Inn, S. C., as overseer of spinning. Mr. Lefoy was formerly at Fork Shoals, S. C.

—J. R. Killian has become overseer of all the carding for the Gaffney Cotton Mills at Gaffney, S. C., where they have formerly employed three overseers. Mr. Killian has had charge of card room No. 1 for several years.

—Ernest Koella, overseer of carding at the Altamahaw Cotton Mills, Elon College, N. C., has resigned.

—James L. Jewett, after 18 years' service with the Boott Cotton Mills, Lowell, Mass., in the spinning department, has resigned to accept a more responsible position in Charleston, S. C.

—Charles Heiser has resigned as assistant superintendent of the Manville Co., Manville, R. I., and has gone to Europe. Frederich Rooch, assistant overseer of the weaving department, has succeeded him as assistant superintendent.

—D. C. Hayes, formerly night overseer of the carding at the Wennonah Cotton Mills, Lexington, N. C., now is employed at the mills as day overseer. The night operations are now in charge of T. Wright.

—A. H. Goodman has succeeded E. D. Byrd as overseer of carding at the Fairfield Cotton Mills, Winnsboro, S. C.

—J. F. Ganer, formerly of Atlanta, Ga., is now overseer of weaving at the Blue Springs Mills, Oxford, Ala.

—William M. Gillis, formerly of Eufaula, Ala., has accepted the position of spinning overseer of the Montgomery, Ala., Cotton Mills Co.

—W. F. Fuqua, day boss spinner at the Highland Park Mill, Charlotte, N. C., has changed back to his old position as overseer of spinninng at the Glencoe Cotton Mill, Burlington, N. C.

—O. H. Farr, formerly of Roswell, Ga., is now overseer of spinning at the Coosa Mill at Piedmont, Ala.

—Thomas Folar, for a number of years secondhand of weaving in the Bourne Mill, Fall River, has accepted a position as overseer of weaving in the Shove Mill in that city. Joseph Provost has succeeded him at the Bourne Mill.

—C. W. Dennett of North Adams, agent of the Johnson Manufacturing Co. and Dunbar Mills, was recently elected general manager of the Glasgow Mills of South Hadley Falls, and will divide his time between North Adams and South Hadley Falls.

—John Delahunt, overseer of the cloth room in the Slade Mills, Fall River, Mass., has resigned to accept a similar position in the Crescent Mill in that city.

—John L. Duffy, secondhand of spinning in the Nourse Mill, Woonsocket, R. I., has resigned.

—James F. Cunningham, overseer of weaving at the Avondale Mills, Birmingham, Ala., has resigned and George Maddox of Swift's Mill, Columbus, Ga., has taken his place..

—F. A. Cumnock, formerly superintendent of the Charlotte (N. C.) Cotton Mills, has succeeded John W. Hawkes as superintendent of the Gold Crown Hosiery Mill, Charlotte, N. C.

—A. A. Brainerd, overseer of carding for the Grosvenordale Co., North Grosvenordale, Conn., has resigned.

—Samuel E. Bentley, who was superintendent of the Potomska Mills, New Bedford, Mass., several years ago, has been offered the superintendency of the mill again at an increased salary.

—George F. Brietz, formerly overseer of spinning at Trion Factory, Ga., has accepted a similar position with the Wiscassett Mills Co., Albermarle, N. C.

—J. J. Bradley formerly of Philadelphia, Pa., has succeeded W. A. Price as superintendent of the Ashby Cotton Mills, Marion, S. C. Mr. Price is going

to enter the Mason Machine Works of Taunton, Mass., to get fully acquainted with combing machines, and in the fall become assistant superintendent with his father at the new Daniel Mills, Lincolnton, N. C.

—Edward J. Barnett, formerly night superintendent at Gaffney, S. C., is now filling the position of superintnedent at the Florence Mill, Forest City, N. C.

—L. E. Anderson, superintendent of the People's Cotton Factory, Montgomery, Ala., has severed his connection with that company. On taking leave the employees presented him with a gold watch chain and fob.

—J. C. Ault, secondhand of spinning at Roanoke Rapids, N. C., has resigned.

—M. C. Withey is now back at work as secondhand for the United States Cotton Co., Central Falls, R. I.

—H. C. Thompson now has charge of the spinning and cone winding at the Marie Cotton Mills, McColl, S. C.

Woolen.

—L. C. Werner has been appointed superintendent of the Schaghticoke Woolen Co., Schaghticoke, N. Y.

—Paul G. Wetstine has left the Merchants Woolen Mills, Dedham, Mass., and now is overseer of weaving at Rochdale, Mass.

—James A. Taylor of Philadelphia, Pa., has been appointed boss finisher by the Amsterdam Woolen Co., Amsterdam, N. Y. Mr. Taylor was formerly boss finisher at the Schuylkill Woolen Mills, Conshohocken, Pa.

—Ernest Trumpoldt, formerly boss finisher for the Middlesex Co., Lowell, Mass., has accepted a similar position with the Camden Woolen Co., Camden, Me.

—James Scott, formerly of Schaghticoke, N. Y., has recently secured the position of boss spinner at the Allen Woolen Mill, Rochester, N. Y.

—P. F. Sheridan, overseer of carding in the Massasoit Woolen Mills, Huntington, Mass., has resigned to accept a similar position in the Faulkner Woolen Mills, Lowell, Mass.

—J. R. Smith, lately at Rochester, N. Y., has returned to Schaghticoke, N. Y., to resume his position in the dressing department of the Schaghticoke Woolen Mills.

—R. T. Robinson, for seven years manager and treasurer of the Powhattan Mfg. Co., Norfolk, Va., has resigned to accept a position with the American Woolen Co. A. W. Chapin has been elected general manager and treasurer of the Powhattan Co.

—William Irving Rambo, of Bridgeport, Pa., has been engaged as overseer of carding and spinning for the first woolen mill in China, and is now en route to China to help start these mills in operation.

—T. N. Parent, formerly at Moosup, Conn., has accepted a position as secondhand of carding and spinning in one of the mills of Hall Bros. of Norwich, Conn.

—Peter Plouff is now boss weaver and designer for Amos Abbott & Co., Dexter, Me.

—J. J. O'Connor, formerly of Ware, Mass., is now with the Seneca Woolen Mills, Seneca Falls, N. Y., as boss spinner.

—Frank Nasch, until recently with the Oakland Mfg. Co., Haight, Md., has succeeded Jonathan Scott as overseer of carding for the Bridgeton (N. J.) Woolen Co.

—C. H. Newry, formerly overseer of dyeing at the Hargraves Woolen Mill, North Shapleigh, Me., is now occupying a similar position at the Massachusetts Reformatory, Concord, Mass.

—James Martin, of Hudson, N. Y., has secured the position of foreman of the finishing room of the Staffordville Woolen Co., Staffordville, Conn.

—J. L. Lyons, formerly overseer of finishing at the Reynolds Woolen Mills, Monson, Mass., is now in the employ of the Great Falls Woolen Co., Somersworth, N. H.

—Joseph King, formerly overseer of dyeing at the Somerville (N. J.) Woolen Mills, is now employed at the Stirling Mills, Lowell, Mass.

—Walter Jones has accepted the position of boss dyer in the Riverside Woolen Mill, Stafford, Conn.

—H. S. Joseph, superintendent of the Jackson (Tenn.) Woolen Mills has resigned to take charge of the Atlanta (Ga.) Woolen Mills.

—James Hamilton, of Tilton, N. H., has accepted a position as boss weaver at the Allen Woolen Mill, Rochester, N. Y.

—Thomas Hartley, recently of North Chelmsford, Mass., has accepted the superintendency of the Landenberg (Pa.) Worsted Mills.

—John Hunt, of Worcester, Mass., is now with the Lakeside Worsted Co., East Madison, Me., as overseer of weaving.

—A. A. Graham, formerly of North Adams, Mass., is now superintendent of the J. L. & T. D. Peck Mfg. Co., Pittsfield, Mass.

—C. Faulkner, formerly secondhand of carding at the Hudson River Woolen Mill, Newburgh, N. Y., has recently accepted a position as overseer of carding nights at the Whitney Woolen Mill, Enfield, N. H.

—John Flynn is now with the Meirose Woolen Co., Auburn, N. Y., as boss weaver.

—Benjamin Eyers, until recently overseer of finishing with the Merchants' Woolen Mills, Dedham, Mass., is now finisher for A. L. Sayles & Sons, Pascoag, R. I.

—Harry Cook is now boss dresser in the Chepachet Worsted Mills, Chepachet, R. I.

—John Brown, night watchman at the Lippitt Woolen Co., Woonsocket, R. I., for 21 years, has retired.

—Thomas W. Beattie, superintendent of the Old Town Woolen Mill, Old Town, Me., since it was started, about eleven years ago, has resigned to accept the office of superintendent of the new Ounegan Woolen Mill in Old Town. The overseers in the mill presented him with a handsome desk and chair as a token of their esteem for him. F. W. Phelps, assistant superintendent, has been promoted to superintendent.

—M. C Brownell, overseer of carding for Charles W. Becker, agent, Amsterdam, N. Y., has resigned.

—Charles H. Blackburn, of Hillsboro Bridge, N. H., has been engaged as overseer of the woolen mills of the Hanover (Ill.) Woolen Mfg. Co.

—Thomas H. Anderson, formerly superintendent of the Coburn Woolen Mills, Skowhegan, Me., has been appointed superintendent of the Lakeside Worsted Mills at East Madison, Me.

—Robert Yates has accepted a position as boss fuller in the Middlesex Mill, Lowell, Mass.

—M. E. Rohan, formerly overseer of weaving with W. E. Tillotson, Pittsfield, Mass., is now with F. S. Mackenzie, Bridgewater, Vt.

Knit.

—Frank E. Wilson, superintendent of the Eagle Knitting Mill, Rockton, N. Y., has resigned, and Thomas Galvin, of Troy, has succeeded him.

—Charles T. Upton, superintendent of the Shaw Stocking Co., Lowell, Mass., has resigned.

—William Slater, formerly secondhand of spinning at the Tivoli Mill, Cohoes, is now with the Commercial Knitting Mill, Troy, N. Y., as overseer.

—Jesse Porter, formerly at the Victor Knitting Mill, has accepted a position as boss knitter with Robert McKinnon, Little Falls, N. Y.

—T. Martin, boss knitter with the Mohawk Valley Cap Mill, Utica, N. Y., has resigned.

—Arthur Mueller of Brooklyn, N. Y., dealer in knitting and seaming machinery, has sailed for Germany, and is expected home about the middle of August.

—Charles La Plant, formerly secondhand of carding with the Parsons Mfg. Co., Cohoes, N. Y., has been promoted to overseer, succeeding John Secour.

—Michael Doherty is now with Messrs. Moore and Tierney, Cohoes, N. Y., filling the position of overseer of carding.

—John Donahue, formerly of the Egbert's Woolen Mill Co., Cohoes, N. Y., is now filling the position of superintendent of the Capron (N. Y.) Knitting Co.

—M. E. Brooks, superintendent of the Plainville Knitting Mill, Plainville, Conn., has removed to Utica, N. Y.

Deaths.

—George W. Cheney died at his home, known as "Point Comfort" in the suburbs of Peekskill, N. Y., July 9th. He was hurt by the falling of a scaffold at his home, his spine being affected. Mr. Cheney was born in Middletown, Conn., 65 years ago. The greater part of his life was spent in Manchester, Conn., where he was engaged in the manufacture of silk. After many years spent there he removed to Tarrytown, where he made car stoves until the decline of that business compelled him to give it up.

—Albert R. Sherman, a well-known citizen of Pawtucket, R. I., died at his summer home in Seekonk, Mass., July 8th. He was for some time agent for the United States Cotton Co. and the Rope Thread Co. When the cotton centennial was held in 1890, he was the superintendent of the celebration. He invented many attachments for cotton machines, as well as the gates for railroad crossings. Two children survive him.

—Robert Sergeson, for many years engaged in the manufacture of loom shuttles, died at his residence, 1006 North Seventh St., Philadelphia, July 2d, aged 73 years. He was born in Ireland and came to this country when ten years of age. His brother had preceded him and engaged in the manufacture of loom shuttles at 931 Catharine St. with Ellis Jackson, being the first firm in Philadelphia to manufacture loom shuttles exclusively. Robert Sergeson learned the business with his brother, and upon the death of the latter he succeeded him, taking as a partner Charles Hahn. Under the name of R. Sergeson & Co., the firm continued at 931 Catharine St. until 1882, when its factory was removed to its present location, at Tulip and Palmer Sts.

—James Whitelaw, for a number of years foreman of the cloth department of the Lancaster Mills, Clinton, Mass., died recently, aged 60 years.

—John D. Norris, for a number of years superintendent of the Garnersville (N. Y.) Print Works, died at his home in that city recently, aged 58 years.

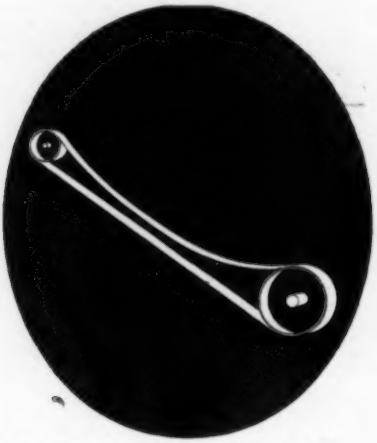
—James Harswell, a well known woolen merchant of Boston, Mass., died recently, aged 71 years. He retired from active business in 1893 on account of ill health.

—Timothy Smith died at his home in Dedham, July 8th. At the age of 12 years he was apprenticed to learn the cotton cloth manufacturing business, and at 18 was appointed overseer in the cotton mill at Canton. Later he filled similar positions and also those of superintendent and agent in cotton mills at Newton, Franklin and Lewiston, Me. Late in the fifties he engaged in the manufacture of knitting cotton, but sold his interest to his partner and then went to New Orleans and set up the first cotton machinery in that city. He also at one time was in charge of a department of what is now the Norfolk Carpet Mills, East Dedham. Of late years he had been engaged in the business of undertaker.

—William O'Neill, for 24 years overseer of carding in the mill of the Ludlow (Mass.) Mfg. Co., died recently, aged 53 years.

—Robert McKenzie, for eight years overseer of dressing at the Coburn Woolen Mills, Skowhegan, Me., died recently at Oswego Falls, N. Y.

—Douglass Jerrold, for a number of years boss cutter in the Astoronga Knitting Mills, Little Falls, N. Y., died July 7th, aged 41 years.



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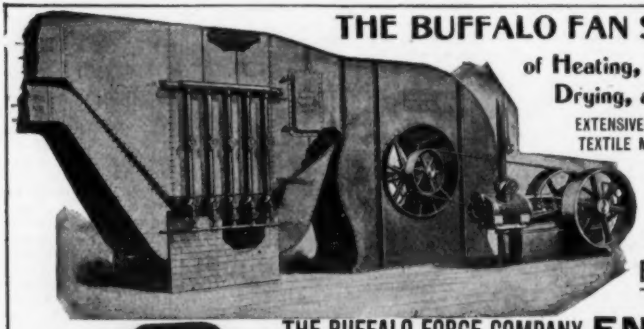
Boston Branch, 170 Summer St. **Chas. F. Chase, Manager.**



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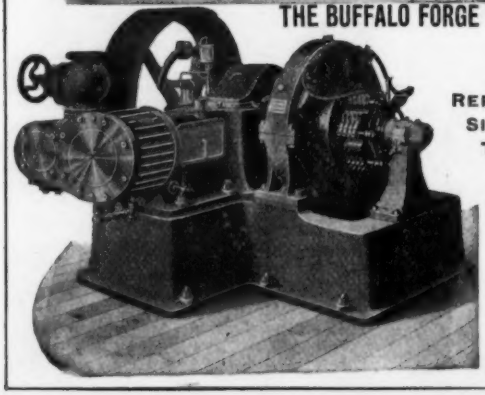

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BUYERS' INDEX.

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Alphabetical Index to Advertisements follows this Classified List.

Air Moistening System.
American Moistening Co., 150 Devonshire St., Boston.

Architects and Mill Engineers.
Berlin Iron Bridge Co. The, East Berlin, Ct.
Ferguson, John W., Paterson, N. J.
Tower & Wallace, Broadway and 25th St., New York, N. Y.

Automatic Feeds for Cotton and Wool.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Balling Machine.
Torrance Mfg. Co, 18 Davis St, E. Newark, N. J.

Bandings.
See under Yarns.

Belting.
Albany Belting & Supply Co., Albany, New York.
Alexander Bros., 410 No. 3d St., Phila., Pa.
Link Belt Machinery Co., Chicago, Ill.
Popham, Henry, & Son, Newark, New Jersey.
See also Mill Supplies.

Belt Dressing.
Alexander Bros, 410 No. 3d St, Phila, Pa.
Cling Surface Co., 168 Virginia St., Buffalo, N. Y.

Belt Hooks.
Field, Frank E., New Haven, Conn.

Bindings.
See Tapes and Braids.

Bleaching Materials.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Bobbin Holder and Thread Catcher.
Burr Bobbin Holder and Thread Catcher Co., Hartford, Conn.

Bobbins, Spools, Shuttles, Etc.
Nashua Spool and Bobbin Co., Nashua, N.H.
Parker, Henry Co., Springfield, Vt.
Tebbets, E. L., & Co., Locke's Mill, Me.

Boiler Compounds.
Straus & Co., 59 Broad St., New York.

Boxes, Cloth Boards, Etc.
Pearson, J. T, Kensington, Pa.

Braiding Machinery.
Thun & Janssen, Reading, Pa.

Braids.
See Tapes, Braids and Edgings.

Brass (Perforated.)
See under Perforated Metal.

Bridges.
The Berlin Iron Bridge Co., East Berlin, Conn.

Brushers.
See Napping Machines.

Buildings (Steel).
The Berlin Iron Bridge Co., East Berlin, Conn.

Burr Pickers.
Curtis & Marble Machine Co., Worcester Mass.
Sargent's, C. G., Sons, Graniteville, Mass.

Calico Printers' Machinery and Supplies.
Birch Brothers, Somerville, Mass.
Butterworth, H. W., Sons & Co., Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
See also Dyeing, Bleaching Machinery, etc.

Card Clothing.
Ashworth, Elijah, Fall River, Mass.
Leigh, Evan A, 35 Mason Building, Boston.

Card Grinding Machinery.
Hardy Machine Co., Biddeford, Me.

Carders' Tools.
Brown, W. H, Mechanic St, Worcester, Mass.

Carpet Machinery.
Altemus, W. W, & Son, 2816 N. 4th St, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Ms.
Furbush, M. A, & Son, Machine Co, Phila, Pa.
Granger Foundry & Machine Co., Providence, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Chemicals and Apparatus.
Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Chemist.
Adriance, John S., 105 East 39th St., New York.

Clutches.
The Eastern Machinery Co., New Haven, Conn.
James Hunter Machine Co., North Adams, Mass.
American Tool & Machine Co., Boston, Mass.

Combs (Wool and Cotton).
Crabb, William, & Co, Newark, N. J.

Commission Merchants (Dry Goods).
Dusenbury, C Coles, & Son, 396-398 Broadway, New York.
Hayes, O. H., 10 Thomas St., New York.

Copper (Perforated.)
See under Perforated Metal.

Copper Print Rollers.
New Bedford Copper Co, New Bedford Mass.
Phillips Co, The Thomas, Providence, R. I.

Copper Work for Dyers.
Butterworth, H. W. & Sons Co., Philadelphia.
Burkhard, Thomas, 494 Flushing Ave., Brooklyn, N. Y.
Granger Foundry & Machine Co., Providence, R. I.
Phillips Co, The Thomas, Providence, R. I.

Corrugated Iron Shutters.
The Berlin Iron Bridge Co., East Berlin, Conn.

Cotton (Egyptian).
Stoddard, Haserick, Richards & Co., Boston.

Cotton Machinery.

Altemus, W. W, & Son, 2816 N. 4th St, Phila-Pa.
Ashworth, Elijah, Fall River, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Mass.
Draper Company, Hopedale, Mass.
Easton-Burnham Co., Pawtucket, R. I.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Whitin Machine Wks, Whitinsville, Mass.
Woonsocket Machine & Press Co, Woonsocket, R, I.

Cotton Openers and Lappers.

Howard & Bullough American Machine Co, Pawtucket, R. I.

Cutters for Knit Fabrics.

Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y

Designer.

William Keiller, 28 Queen St , Belfast, Ire.

Dextrine.

Stein, Hirsh & Co, 165 Duane St., New York.

Dryers.

Birch Brothers, Somerville, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Kenyon, D. R. & Son., Raritan, N. J.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Dusters.

See Wool and Waste Dusters.

Dyers, Bleachers and Finishers

American Woolen Finishing Works, 164 High St., Boston.
American Yarn Printing Works, 134-150 North 22d st., Philadelphia.
Boston Finishing Works, Williamstown Mass.
Brophy's, T, Sons, Jasper St, Philadelphia.
Cohoes Dye Works, Cohoes, N. Y.
Cranston Worsted Mills (yarns), Bristol R. I.
Firth & Foster Co, Kensington, Pa.
Greenwood, R. & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.
Littlewood, G. J., & Sons, Manayunk, Pa.
Merchants Dyeing Co., Chicago, Ill
Molt Bros., Millbury, Mass. (Indigo Blue.)
New England Thread Co , Pawtucket, R. I.
Novelty Dye Works, Cincinnati, Ohio.
Orianna Bleach Works, 2550 No. 3d St., Philadelphia.
Pawtucket Dyeing & Bleaching Co, Pawtucket. R. I.
Rowland, Samuel, Schuylkill Haven, Pa.
Warren, W, Thread Works, Westfield, Mass.

Dyeing, Drying, Bleaching and Finishing Machinery.

Birch Bros., Somerville, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Butterworth, H. W, & Sons Co, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Co, 22 and Wood Sts, Philadelphia.
Granger Foundry & Machine Co, Providence, R. I.
Hopkins, Machine Works, Bridgeton, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Kenyon, D. R. & Son, Raritan, N. J.
Lincoln, The, Co, 54 Arch St, Hartford, Ct.
Phenix Iron Foundry, Providence, R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
Phillips, The Thomas Co, 91-95 South Main St, Providence, R. I.
Rasden Machine Co., Warren, R. I.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Woonsocket Machine & Press Co, Woonsocket, R. I.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Dye Sticks,

Bailey, Frank, Cedar Brook, New Jersey.
Haedrich, E. M, 311 1-2 Walnut St, Phila, Pa.

Dyestuffs and Chemicals.

Amend Process Co., 205-211 Third Ave., New York.
American Aniline Co., 138 No. Front St., Philadelphia.
Anchor Color Mfg. Co, 464 Cherry St, New York.
Atteaux, F. E. & Co., 174-176 Purchase St., Boston.
Berlin Aniline Works, 72 Front St., N. Y.
Bischoff, & Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Corey, S. J, 273 Congress St, Boston.
Dillon & Co, 20 Cedar St, New York.
Farbenfabriken of Elberfeld Co, 40 Stone St, N. Y.
Geisenheimer & Co, 189 Front St, New York.
Innis & Co, 3 Cedar St, New York.
Jaeck Bros., The, Co., 62-68 No. 11th St, Brooklyn, N. Y.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y
Johnson, Wm. G, & Co, Uncasville, Conn.
Keller, John J, & Co, 104-106 Murray St, N. Y.
Klipstein, A, & Co, 122 Pearl St, N. Y.
Koechl, Victor, & Co, 122 Hudson St, N. Y.
Matheson, W. J, & Co, 182-184 Front St, N. Y.
Merrimac Chemical Co, Boston, Mass.
Molt Bros., Millbury, Mass. (Indigo Blue.)
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Palmetto Co., The, 942-44 Drexel Building, Philadelphia.
Pickhardt & Kuttroff, New York.
Richmond & Foley, 235 N. Front St., Philadelphia.
Roessler & Hasslacher Chemical Co, 100 William St., New York.
Sharpless Dye Wood Ext. Co, 22 N. Front St, Phila, Pa.
Stamford Mfg. Co, 133-137 Front St., N. Y.
Stone & Ware Co, The, 157 Maiden Lane, N. Y.
Sykes & Street, 85 Water St, N. Y.

Edgings.

See Tapes, Braids and Edgings.

Electrotyping and Printing.

Whitcomb, H. C, & Co, Boston.

Elevators.

Cohoes Foundry & Machine Co, Cohoes, N. Y.
Eastern Machinery Co, The, New Haven, Conn.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Engineers, Mechanical.

Berlin Iron Bridge Co., The, East Berlin, Conn.
Ferguson, John W, Paterson, N. J.

Express Money Orders and Travelers' Cheques.

American Express Co. offices in every city

Fans—Exhaust and Ventilating.

See Ventilating Apparatus.

Feed Water Heaters.

Kelley, Benj. F. & Son, 91 Liberty S New York.

Feed Water Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.
Phœnix Iron Foundry, Providence, R. I.

Finishing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Fireproof Construction.
The Berlin Iron Bridge Co., East Berlin, Conn.

Fluted Rolls.
Cohoes Foundry & Machine Co, Cohoes, N.Y
Thurston, A. G, & Son, Box 528, Fall River Mass.

Friction Clutches.
See Clutches.

Friction Hoisting Drums
Eastern Machinery Co., New Haven, Conn.

Fulling Mills for Woolen Goods.
Hopkins, Machine Works, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass.

Gas Engines.
Jones, Lewis, 60½ and Media Sts, Phila, Pa.

Gas Singeing Machines.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Ms.
Granger Foundry & Machine Co., Providence, R. I.

Gear Cutting Machine.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E, Co, New London, Conn.

Harness Varnish.
D. L. Witmer & Bro, 5th St. and Germantown Ave, Philadelphia.

Heating.
See Ventilating.

Heddles.
Watson, L. S, Mfg. Co, Leicester, Mass.

Hoisting Machinery.
The Eastern Machinery Co., New Haven, Conn.

Hosiery Boards.
Pearson, J. T, Kensington, Pa.

Humidifying Apparatus.
American Air Moistening Co., Boston.

Hydro Extractors.
American Tool & Machine Co., Boston.

Ink, Stamping.
Witmer, D. L, & Bro, 5th St. and Germantown Ave, Philadelphia.

Insurance (Employers' Liability).
Employers' Liability Assurance Co, 25 Central St, Boston, Mass.

Knit Goods Edgings, Trimmings, etc.
Cathcart, John & Co., 115 Franklin St., New York.
Cheney Bros, Silk Goods, 479 Broome St, N. Y.
Friedberger & Co, Edgings, Germantown Phila, Pa.
Hepner & Horwitz, Lacings, 30 Howard St, N. Y.
Krout & Fite Mfg. Co, Allegheny Ave. and Emerald St., Phila.
Weimar Bros, 1817 East York St, Phila. Pa.

Knit Goods Finishing Machines, Crochet, Etc.
Excelsior Sewing Machine Co, 120 N. 7th St, Phila, Pa.
Merrow Machine Co, The, Hartford, Conn.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 2079 E. Cumberland St, Phila Pa.

Knitting Machine Cylinders.
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Machinery.
Beattie Machine Works, Cohoes, N. Y.
Branson Machine Co., 506 John St., Philadelphia.
Campbell & Clute, Cohoes, N. Y.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Excelsior Knitting Machine Manufacturing Co., Allentown, Pa.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos. (Cutters, etc.), Cohoes, N. Y.
Leighton Machine Co, Manchester, N. H.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
McMichael & Wildman Mfg. Co, Norristown, Pa.
Mueller, A, 760 Lexington Ave, Brooklyn, N. Y.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 127 Bread St, Phila, Pa.
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 2079 E. Cumberland St., Phila., Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Needles and Supplies.
Breedon, Wm, & Son, Amsterdam, N. Y.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Crane Mfg. Co, Lakeport, N. H.
Dodge Needle Co., Manchester, N. H.
Ives, Loyal T, New Brunswick, N. J.
Lydall, H, & Foulds, Manchester, Conn.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.
Bullock & Crenshaw, 528 Arch St Phila, Pa.

Looms.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St, Phila, Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A., 35 Mason Bldg., Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Ms,
Woonsocket Machine & Press Co, Woonsocket, R. I.

Lubricators
Ameledema Oiliess Bearing Co., Berkeley St, Wayne Junction, Philadelphia.
Dixon, Jos., Crucible Co, Jersey City, N. J.
Graphite Lubricating Co., Bound Brook, N. J.

Lumber.
Stearns, A. T, Lumber Co, Neponset, Mass.

Lumpers.
Gerry, George, & Son, Athol, Mass.

Machinery Dealers.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.

Machinists' Tools.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E. Co, New London, Conn.

Mails.
Walder, J, Paterson, N. J.

Measuring and Folding Machines.
Curtis & Marble, Machine Co, Worcester, Ms.
Elliott & Hall, 544 Hermon St, Worcester Mass.

Mercerizing Machinery.
Butterworth, H. W. & Sons, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.

Mills For Sale.
Denny, R. B., 143 Federal St., Boston.

Mill Builders and Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct
Ferguson, John W, Paterson, N. J.

Mill Supplies.
American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Bristol, The, Co., Waterbury, Conn
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.

Dixon Lubricating Saddle Co., Bristol, R. I.
Easton-Burnham Co., Pawtucket, R. I.
Frost, Geo. T., Paterson, N. J.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Mitchell-Bissell Co., 170 Summer St., Boston.
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg.Co, Leicester, Mass.

Napping Machines.
American Napping Machine Co, Williamstown, Mass.
Ardrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Noils (Silk.)
See Novelty Yarns, Tinsels, Silk Noils, etc.

Pantagraphs for Mill Engraving.
Johnson, C. A, & Co, 22 Dey St, New York.

Patterns of European Novelties.
European Pattern Supply Co., 530 Broadway, N. Y.
European Textile Sample Co., 56 Worth St., New York.

Patent Solicitors.
Crosby & Gregory, 24 School St, Boston, Mass.
Wright, Brown & Quinby, 53 State St, Boston, Mass.

Perforated Metal.
Beckley, A. J. & Co., Garwood, N. J.
Harrington & King Perforating Co., 230 North Union St , Chicago. Ill.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co., 100 William St, New York.

Picker Sticks.
La Bar, L. T., Beateyestown, N. J.
Loom Picker Co., Biddeford, Me.

Picking, Carbonizing and Garnetting.
Garfield Woolen Co, Garfield, N. J.

Pipe Covering (Magnesia).
Keasby, R. A, 83 Warren St, New York.

Pneumatic Conveying.
See Ventilating.

Porcelain Guides.
Mitchell-Bissell Co., 170 Summer St., Boston.

Power Transmitting Machinery.
Ameledema Oilless Bearing Co, 149 West Berkley St, Wayne Junction, Pa.
Channon, H, Co, 25 Market St, Chicago, Ill.
Christiana Machine Co., Christiana, Pa.
Eastern Machinery Co, New Haven, Conn.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Kilburn, Lincoln & Co, Fall River, Mass.
Link Belt Machinery Co, Chicago, Ill.
Saginaw Manufacturing Co., Saginaw, Mich.
Wall, William F. Rope Company, 56 South St., New York.

Presses.
Boomer & Boschet Press Co., 338 West Water St., Syracuse, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia
Crawford. J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Hart, Charles, Frankford, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Phillips Co, The Thomas, Providence, R. I.
Sullivan Machinery Co., Claremont, N. H.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Pressing Irons, Gas and Air Heated.
Edwards Sad Iron Co , 1420 Chestnut St., Philadelphia.

Printers and Embossers.
Novelty Textile Printing Co, 447-449 W. 14th St, New York.

Pulleys.
See Power Transmitting Machinery.

Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.

Quills.
Packer, Henry, Co., Springfield, Vt.

Reed and Harness Manufacturers.
American Supply Co, Providence, R. I.
Walder, J, Paterson, N. J.

Ribbons.
Cheney Bros, S. Manchester, Ct.

Roofing, Gravel, Slag and Composition.
Armitage Mfg. Co, Richmond, Va.
Eastern Granite Roofing Co., Jersey City N. J.

Roofing, Paint and Paper.
Armitage Mfg. Co, Richmond, Va.

Roving Cans and Sheet Metal Work for Mills.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.
Sullivan Machinery Co, Claremont, N. H.
Walrus Fibre Mfg. Co., Medford, Mass.

Saddles and Stirrups.
Dixon Lubricating Saddle Co., Bristol, R. I.

Schools.
Lawrence Scientific School, Cambridge, Mass.
Lowell Textile School, Lowell, Mass.
New Bedford Textile School, New Bedford, Mass.
Philadelphia Textile School, Phila, Pa.

Screens (Perforated.)
See under Perforated Metal.

Sewing Machines and Supplies.
Birch Bros., Somerville, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Frame, Gibbons, 2nd and Diamond Sts, Phila, Pa.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Nye & Tredick, 606 Arch St, Phila, Pa.
Standard Sewing Machine Co, Cleveland, Ohio.
Scott & Williams, 6th and Arch Sts, Phila, Pa.
Union Button Sewing Machine Co., 164 High St., Boston, Mass.

Shearing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Shell Rolls.
Cohoes Foundry & Mach. Co, Cohoes, N. Y.
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Shoddies.
See Wool Shoddies.

Shuttles.
See Bobbins, Spools, Shuttles, Etc.

Shuttle Eyes.
Mitchell-Bissell Co., 170 Summer Street, Boston.

Silk Machinery.
Butterworth, H. W. Sons Co, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Mason Machine Works, Taunton, Mass.

Singe Plates.
Butterworth, H. W. Sons Co., Philadelphia.
New Bedford Copper Co, New Bedford, Mass

Sizing, Starch and Gums.
Quaker City Chemical Co., Wayne Junction, Philadelphia
Stein, Hirsch & Co, 165 Duane St, New York.

Slashers.
Cohoes Foundry & Machine Co, Cohoes, N. Y.
Lowell Machine Shop, Lowell, Mass.
Phillips C · The Thomas, Providence, R. I.

Soaps.
Holbrook Manufacturing Co., New York.
India Alkali Works, Boston, Mass.

Spindles.
Bamford & Smith, Pascoag, R. I.
Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Easton-Burnham Co., Pawtucket, R. I.
Ward & Vandegrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

Spindle Tubes.
Bamford & Smith, Pascoag, R. I.

Spinning Cylinders.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Spinning Frames.
See Cotton Machinery.

Spinning Frames for Wool
Woonsocket Machine and Press Co., Woonsocket, R. I.

Spinning Rings.
Draper Company, Hopedale, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.

Spinning Tubes.
Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Spools. *See Bobbins, Spools Shuttles, Etc.*

Steam Boilers.
Brown, C. H, & Co, Fitchburg, Mass.
Lee-Odlum Co., Memphis, Tenn.

Steam Boiler Compound.
Straus & Co., 55 Broad St., New York.

Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.

Steam Engines.
Brown, C. H, & Co, Fitchburg, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Hooven (The), Owens & Rentschler Co, Hamilton, O.
Sturtevant, B. F. & Co., Boston.

Steam Specialties.
Butterworth, H. W. Sons Co., Philadelphia.

Tanks, Tubs and Vats.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Challenge Wind Mill & Feed Mill Co, 195 High St, Boston, Mass.
Corcoran, A. J, 11 John St, New York.
Cypress Lumber Co, Apalachicola, Fla.
Stearns, A. T, Lumber Co, Neponset, Mass.
Vaughn Machine Co., Peabody, Mass.
Woolford, George, 2240 No. 9th St, Phila, Pa.

Tapes, Braids and Edgings.
Cathcart, John, & Co, 115 Franklin St, N. Y.
Fleming & Chapin, 229 Church St., Phila.
Friedberger Mfg. Co, Germantown, Pa.
Hamilton, J. H , & Co, 275 Church St, N. Y.
Krout & Fite Mfg. Co., Allegheny Ave. and Emerald St., Philadelphia.
Weimar Bros, 1817 East York St, Phila, Pa.
Young, Wm. M, 3638-40 Frankford Ave, Philadelphia, Pa.

Telephones.
F O. Flummer, 620 Atlantic Ave., Boston.

Tentering Machines.
See Dyeing, Bleaching Machinery, Etc.

Tension Pulleys.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Testing Machines.
Howard, Geo. C., 1783 Barker St., Phila., Pa

Towers.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Challenge Wind Mill & Feed Mill Co, Boston, Mass.

Traveler's Cheques.
American Express Company.

Turbines.
(See Water Wheels.)

Ventilating Apparatus.
Allington & Curtis Mfg. Co , Saginaw, Mich., and East Cambridge, Mass.
American Air Moistening Co., Boston.
Berger Bros. Co., 231-237 Arch St., Philadelphia.
Berry, A. Hun, 23 W. 1st St, Boston, Mass.
Buffalo Forge Co., Buffalo, N. Y.
New England Ventilating & Heating Co, Providence, R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philapelphia.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Washers (Cloth).
Birch Brothers, Somerville, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Hopkins, Machine Works, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Phillips Co, The Thomas, Providence, R. I.

Watchman's Clock.
Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Nanz & Co, 127 Duane St., New York.

Water Wheels.
Bradway, C. P., W. Stafford, Ct.
Christiana Machine Co., Christiana, Pa.
Humphrey Machine Co., Keene, N. H.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, O.

Water Wheel Governors.
Bradway, C. P, West Stafford, Ct.
Cohoes Foundry & Machine Co, Cohoes N. Y.
Leffel, James & Co, Springfield, Ohio.
Lombard Water Wheel Governor Co, 61 Hampshire St, Boston.

Winders. (Hosiery.)
Universal Winding Co, 226 Devonshire St, Boston.

Wood Pulleys.
Saginaw Manufacturing Co, Saginaw, Mich.

Wool Cleaning Compound.
India Alkali Works, Boston.

Wool Combing Machinery.
Leigh, Evan A. 35 Mason Bldg., Boston.

Wool Extracts.
Garfield Woolen Co, Garfield, N. J.

Wool and Waste Dusters.
Gerry, Geo, & Son, Athol, Mass.
Sargents', C. G., Sons, Graniteville, Mass.
Stillman-Randall Machine Co, Westerly, R. I.

Woolen and Worsted Machinery.
Altemus, W. W, & Co, 2816 N. 4th St, Phila Pa.
American Tool and Machine Co., Boston.
Atlas Manufacturing Co , Newark, N. J.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. Sons Co., Philadelphia.
Cobb, Thad. S., Machinery Co., Lowell, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A. & Son Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Kenyon D. R. & Son, Raritan, N. J.
Leigh, Evan A. 35 Mason Bldg, Boston.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Philadelphia.
Phillips Co The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Woonsocket Machine & Press Co Woonsocket, R. I.
Woonsocket Napping Machine Co., Woonsocket, R. I.

Wool, Hair and Noils.
Becker, Chas. W, Agt, Amsterdam, N. Y.
Fowles & Co, 106 Church St, Phila.

Wool Shoddies.

Becker, Chas. W, Agt, Amsterdam, N. Y
Garfield Woolen Co, Garfield, N. J.
Slack, Wm. H. B., & Bro, Springfield, Vt.

Wool Sorters, Scourers and Carbonizers.

Morse Wool Treating Co., Norton, Mass.

Wool Washing, Preparing and Drying Machinery.

Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.

Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G, Sons, Graniteville, Mass.

Woolen Commission Merchants.

Dusenberry, C. Coles, 396 Broadway, New York.

Hayes, O. H. & Co., New York.

Yarns, Threads, Etc.

Banding.

Frost, Geo. T, Paterson, N. J.
Moore, C. & Co, 12 S. 5th St, Phila, Pa.
Warren, W, Thread Works, Westfield, Mass.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Cotton Yarns.

American Cotton Yarn Exchange, 45 Milk St., Boston.
Catlin & Co, New York and Boston.
Clark, Wm, Co, Westerly, R. I.
Cohannet Mills, Taunton, Mass.
Crossland, Enos, Sons, Philadelphia, Pa.
Dana Warp Mill, Westbrook, Me.
Eddy & Street, Providence, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fleming & Chapin, Philadelphia.
Germantown Spinning Co, Germantown, Pa.
Grant Yarn Co, Fitchburg, Mass.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hadley Co, Holyoke, Mass.
Indian Orchard Co., Indian Orchard, Mass.
Jenckes, E., Mfg. Co., Pawtucket, R. I.
Mitchell, Jas. E, & Co, Boston and Phila, Pa.
Montgomery, J. R, Co, Windsor Locks, Ct.
Monument Mills, Housatonic, Mass.
New England Thread Co., Pawtucket, R. I.
Orswell Mills, Fitchburg, Mass
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Gassed Yarns.

Greene & Daniels Mfg. Co, Pawtucket, R. I.

Glazed Yarns.

Eichmann & Sternberg, 530 Broadway, cor Spring St., N. Y.
Indian Orchard Co., Indian Orchard, Mass.
Malcolm Mills Co, Frankford, Pa.
Meyer, John C. & Co., 87 Summer St., Boston.
Montgomery & Co, J. R, Windsor Locks, Ct.
New England Thread Co., Pawtucket, R. I.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Harness Twines.

Cranston Worsted Mills, Bristol, R. I.
Fawcett, Hughes, 115 Franklin St., N. Y.
Hadley Co, 95 Milk St, Boston, Mass.
Moore, C., & Co., (S. W. cor. 5th and Market Sts.)
Warren, W, Thread Works, Westfield, Mass
Whittier Cotton Mills, Lowell, Mass.

Hosiery and Knitting Yarns.

Boyer, B. F, & Co, Camden, N. J.
Campbell, Geo. & Co, Phila, Pa.
Champlain Silk Mills, Whitehall, N. Y.
Clark, Wm. Co, Westerly, R. I.
Clasgens, The J. & H. Co. New Richmond, Ohio.
Cohannet Mills, Taunton, Mass.
Colchester Mills, 86-88 Franklin St, New York.
Cranston Worsted Mills, Bristol, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St, N. Y.
Germantown Spinning Co, Germantown, Pa.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E., Manufacturing Co, Pawtucket, R. I.
Mitchell, James E, & Co, Phila. and Boston
Monument Mills, Housatonic, Mass.
Orswell Mills, Fitchburg, Mass.
Skerry, A T, & Co, 47 Leonard St, N. Y.
Walcott & Campbell Spinning Co, New York Mills, Oneida Co, N. Y.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Flax, Hemp, Jute and Ramie.

Eichman & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fawcett, Hughes, 115 Franklin St., N. Y

Mohair Yarns.

Cranston Worsted Mills, Bristol, R. I.
Eichmann & Sternberg, 530 Broadway, cor Spring St., N. Y.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Novelty Yarns, Tinsels, Silk Noils, Etc.

Champlain Silk Mills, Whitehall, N. Y.
Cranston Worsted Mills, Bristol, R. I
Eichmann & Sternberg, New York City.
Indian Orchard Co., Indian Orchard, Mass.
Malcolm Mills Co, 229 Chestnut St, Phila, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Silk Yarns.

Champlain Silk Mills, Whitehall, N. Y.
Cheney Bros, S. Manchester and Hartford Ct.
Eddy & Street, Providence, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Meyer, John C, & Co., 87 Summer St., Boston.
Ryle, Wm, & Co, 54 Howard St, N. Y.

Woolen and Merino Yarns.

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Clasgens, The J. & H. Co, New Richmond Ohio.
Crossland's Enos, Sons, Philadelphia.
Eddy & Street, Providence, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E. Mfg. Co., Pawtucket, R. I.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

Worsted Yarns.

Alleghany Worsted Mills, Phila, Pa.
Boyer, B. F, & Co, Camden, N. J.
Campbell, Geo. & Co, Phila, Pa
Campion, Richard, 17 Bank St., Philadelphia.
Cranston Worsted Mills, Bristol, R. I.
Croft, Howland, & Sons, cor. Broadway and Jefferson Ave., Camden, N. J.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Eleasser, Albert R, Addingham, Pa.
Goff, D. & Sons, Pawtucket, R. I.
Herbst & Jones, 21st and Naudain Sts Philadelphia, Pa.
Pocasset Worsted Co., Thornton, R. I.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Waverly Worsted Co, Main St. and Green Lane, Manayunk, Pa.

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This is the only work especially devoted to the drawing and roving processes, and is intended to benefit those who are directly concerned in the practical operation of the machines under discussion, with particular stress on the points which will give the best results from machines in their actual manipulation. Among the subjects treated may be mentioned the following: Drawing Frames; Fly Frames—Winding, Building Motion, Differential Motions; Roller Setting and Drawing; Defective Roving Bobbins; How to Put up Frames; etc. Price, $3.00.

Cotton. By Christopher P. Brooks, 384 pages, 174 illustrations.

This is the most acceptable book on this subject that has been published. The subject has been presented in a remarkably attractive style, and is treated in a manner not to be found elsewhere. Cotton is considered in its botanical features, its cultivation, preparation for the market, and as an article of commerce. A full chapter is given on the commercial uses of the seed for oil, etc. It is a volume that will be of interest to the cotton factor, merchant, broker, and all whose business it is to buy or sell the fibre in its raw or manufactured condition. We cannot speak in too flattering praise regarding the merits of this book. Price $3.00.

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—New Jersey, Camden. The Keystone Lace, Rug & Carpet Mfg. Co. has been incorporated to manufacture rugs and carpets. Capital stock, $125,000, of which $1000 has been paid in. The incorporators are W. F. Eidell, F. R. Hansell, James M. Crawford.

—New Jersey, Paterson. L. Krause, proprietor of the Utopia Silk Co., 26 looms, located in the new Harding Mill, has sold the equipment to Dunlop Bros., who are now located at Spring Valley, N. Y. The machinery is being shipped to them. Mr. Krause has sailed to Europe on account of poor health. Whitehouse Bros., broad silk manufacturers, have leased the space in the Harding Mill recently occupied by the Utopia Silk Co., and will put in their machinery at once.

—New York, Canton. O. W. Barlow, who has been operating a steam dyeing and wool carding mill under the name of Barlow & Co., with R. W. Conway as partner, has now transferred his interest to Mr. Conway, who will continue the business.

—New York, Hagaman. The Hagaman Knitting Mills Co. has been chartered with a capital of $15,000. The directors are Richard H. Ewart and Samuel C. Morrison of New York and Edward K. Figgers of Orange, N. J.

—New York, Fort Hunter. The Victor Rug Mill has been sold to W. C. J. Dexter of Fultonville, N. Y., who will use it in manufacturing silk novelties.

—New York, Utica. The old Utica Steam Woolen Mill, which has been idle for a number of years, has been purchased by local capitalists, and machinery and buildings will probably be sold off separately.

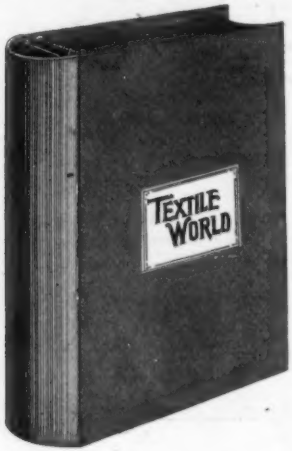
—North Carolina, Shoals. G. W. Hinshaw of Winston, N. C., informs us that he has owned the property at Shoals on the Yadkin River and N. W. N. C. Railroad for several years, including the best water power in the state. He has recently purchased additional land with the view of improvement, but has no definite statement to make at this time regarding his plans.

—Pennsylvania, Philadelphia. The firm of George S. Lees & Co., woolen carpet yarn spinners, Twentieth and Cora Sts., Germantown, was dissolved May 31st by mutual consent. Newton Jones, one of the partners, is liquidating the business.

—Pennsylvania, Royersford. The mill which has been operated by Fritz & Krause, including 70 machines, has been sold and the firm will locate elsewhere. They have found it difficult to secure help here. They now operate a branch mill at Pottstown, Pa., and possibly they will remove their entire plant to that place.

—South Carolina, McColl. The Marie Cotton Mills will increase its capital stock from $50,000 to $100,000.

-1898- BINDER.



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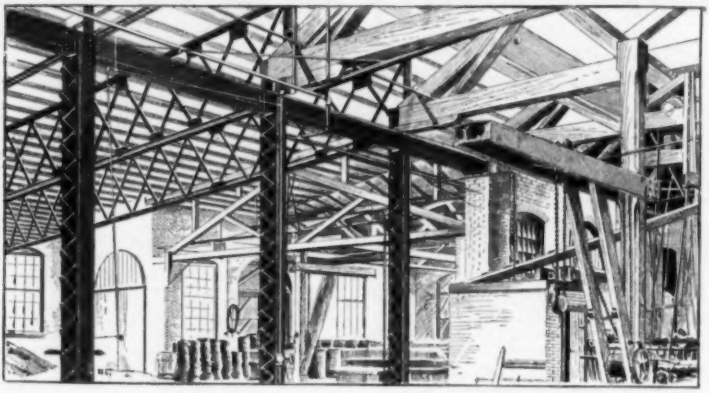

The above illustration is taken direct from a photograph, and shows Iron Fire-Proof Construction in connection with old wooden construction. This Iron Roof was built as an addition to the main Rolling Mill of The Waterbury Brass Co., at Waterbury, Conn. About two years after this was built, fire destroyed the main mill leaving the addition standing without injury, so that the iron work was afterwards used in the construction of the new mill. This result shows the iron work when properly constructed may be subjected to the most severe heat without injury.

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The advertisers in the following columns should be addressed in care of TEXTILE WORLD or inquiries concerning them may be addressed directly to "Information Department TEXTILE WORLD," as full particulars of each advertiser are on file, and the addresses of suitable agents, superintendents and foremen for every branch of the textile industry will be furnished to manufacturers.

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1268 **Woolen** superintendent or designer. First-class experience in England and America. A first-class man in every way; age 34; married. Fancy worsteds, cheviots, novelty goods, cassimeres, overcoatings, cloakings, dress goods, piece dyes, worsteds and cheviots.

218 **Woolen Superintendent, Designer** or Boss Weaver. Age 35; American. Has worked on all classes of dress goods and men's wear. Can furnish good references and will accept a moderate salary.

1386 **Woolen Superintendent or** Boss Carder. Age 43; American. Familiar with the manufacture of all kinds of woolen goods, is well recommended, and can go immediately.

1490 **Superintendent** Age 37; German. Has worked on plain and fancy worsteds, cotton worsted, all woolen mixes and mixed cassimeres. 14 years' experience in this country.

COTTON SUPERINTENDENTS.

189 **Cotton Superintendent** wants position in Northern mill. Has been in charge of Southern mills for 7 years. Previous experience in N. E. Is well known among mill men, and can furnish the best of references. Age 35; married.

1539 **Superintendent or Agent.** Age 43; married. Has worked on all classes of linen and cotton goods, plain and fancy. At present manager of a large mill, but can leave at one months notice.

1532 **Superintendent.** Has been in mill business all his life, and been with the present firm for a number of years, having been promoted several times. He wishes to better himself.

1306 Young American wants position as cotton superintendent. Experience mostly on cotton warps. Has been bookkeeper, overseer of carding and spinning; also superintendent in Massachusetts mills.

1432 **Desires Position as Superintendent** of cotton mill, or would take overseer of carding in large mill, where good wages can be secured. Age 30; married.

1464 **Superintendent of Fancy Cotton** Weaving. Age 43; married; an American. Will not work outside Northern and Eastern states. Has worked on fancy goods of all kinds, white and colored cottons, worsteds and silks. Is familiar with all makes of looms and dobby heads. Is at present employed, but wishes to better himself, if possible. Refers to present and past employers.

1453 **Superintendent** desires position in a cotton mill. Age 36; married; American. Has worked on prints, fine sateens, sheeting ginghams, duck, denims, cottonades, ticks, awnings and domets. Is familiar with all makes of spinning, spooling and warping machinery. At present employed, but wishes to obtain a more advanced position. Refers to present and past employers.

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1496 **Superintendent or Boss Weaver.** Age 45; single. Large experience on all classes of cotton goods and all makes of American machinery. At present employed, but wishes to obtain a better position. Now in charge of 1800 looms. Is willing to go South.

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1578 **Wool or Worsted Carder.** 20 years' experience as overseer, with excellent references. Understands almost all kinds of machines. Would also consider position as traveling agent for mill supplies, as he has a large acquaintance with mill men.

1580 **Boss Carder.** Experience on all kinds of wool stock, especially for knit goods. At present employed, but would like to change for a position paying $3, or over. Good references.

1574 **Woolen Carder,** with present employers 8 years, desires to change for larger room. Davis & Furber machines. References all right. Young man, steady and reliable.

1582 **Woolen Carder or Second-Hand.** Large experience in Massachusetts mills. Age 28, single. American. Good references. Is at present out of work and will start at moderate wages.

1553 **Woolen Carder and Spinner.** Well recommended by past employers. Most experience on carding, wool, worsted, shoddy. Has also had charge of spinning in addition to the carding. Age 35.

1562 **Overseer, Carding and Spinning** of all grades of woolen yarn. Many years' experience in both departments, and is well spoken of by past employers. Age 38; married. Good machinist. Has set up machinery.

1564 **Boss Woolen Carder,** experience on all kinds American cards and Platt cards. Refers to several good mills where he has worked from 3 to 6 years. Very steady and hard worker. Age 42, not married

1565 **Wool Carder,** has worked 9 years as second hand under some of the best carders in N. E. Experience on nearly all kinds of stock. Temperate and a hustler. Age 30, single. Would take a good second hand job.

COTTON CARDERS.

1403 **Cotton Carder** with 17 years experience in N. E. mills as overseer and second-hand, now in the South but wants to return North. Has never worked for less than $3.00 but would take $2.50 to change. Married. Age 38. Best of references.

1469 **Cotton Carder and Spinner.** Has had charge of both in good mills. Excellent references. Age 37, married.

1535 **Second-Hand Carding, or** Speeder Fixer. Age 41; American. Is a first class man, and thoroughly acquainted with every detail of his work. At present employed, but can leave on very short notice. Prefers to obtain work in New England States.

1315 **Cotton Carder.** Over 20 years' experience as overseer in first class mills. At present employed. Well up on prints and light and heavy sheetings. Knows American and English cards, and speeders. Best references.

1238 **Second** hand of cotton carding. 37; married. Open for engagement.

1368 **Overseer on Second-Hand Cotton** Carding wants a position in small room at $2.50 per day or upwards. Will do his own grinding. Or, would take a first-class second hand job. Last five years in one place. Thoroughly practical and understands all the machinery in the card room. Age 37; married. Good reference. Prefers New England.

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1461 **Spinner, on Cotton or Wool.** Age 33; married; French. Has worked in one of the best thread works in this country, also in Alsace-Lorraine, on yarns from 70s to 160s. Is familiar with Dobson & Barlow machines and Schlumberger mules.

1493 **Boss Spinner.** Age 25; unmarried; German. Has worked on cassimeres, cheviots, stockinets, satinets and camel hair goods. Can operate American mules, and has worked for several years in American mills, to which he refers.

847 **Boss Woolen Spinner** with large experience and excellent references. Will start at $2.50 a day. Has spun yarns for fine dress goods, and yarns for low grade wool and cotton and shoddy mixes, and all cotton for hosiery. Perfectly reliable and temperate.

1543 **Woolen Spinner and Carder.** Has handled both departments together and separately. Will go South or West. Age 29; single.

1545 **Woolen Spinner.** A very reliable man, who has worked up to 2nd hand in a good N. E. mill, wishes to secure a position as overseer.

1519 **Overseer Spinning.** Age 31; American; married. Has worked on yarns from one run to 5¼. Will accept an average salary. At present employed, but wishes to better himself.

COTTON SPINNERS.

909 **Overseer Cotton Spinning,** spooling, warping, twisting, slashing and drawing-in. 16 years experience, mostly in this department. At present out of work because of change in organization. Can refer to leading N. E. mills. Will go South. Age 30; married.

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1550 **Cotton Spinner.** Boss or second hand. 9 years' experience. Parr, Platt, Asa Lee's mules, Whitin frames. Now employed but wishes to get larger experience. Age 25; single, American.

1438 **Cotton Mule Spinner** who has worked on plain white goods only desires to secure a permanent position in the Eastern or Central states. Has good references and is perfectly reliable. Age 45. Married.

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1521 **Overseer Weaving,** on woolen or cotton goods. Age 42; American; married. Has worked on all classes of cotton, woolen, worsted and silk goods. Refers to past employers and others.

1585 **Woolen Weaver.** Has had large experience as fixer and weaver on Davis & Furber looms. A man of good habits and character. Now employed in a Massachussets mill. Good references. Also familiar with Crompton & Knowles and Gilbert looms.

1587 **Overseer of Weaving or Designer.** A man of undoubted ability and large experience. Is at present employed in a mill which is not large enough to satisfy him. Would like to change. Experience on almost all kinds of looms, and can furnish the best of references as to character and ability.

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1547 **Boss Weaver,** with very long and varied experience. Familiar with all makes of machinery. Has been superintendent but would accept overseer job in a first class mill.

1551 **Boss Weaver,** especially up on plush looms, both wire and double. Has worked in almost every department of woolen mill and would take charge of a small plant at moderate salary. Age 42; married. New England experience.

COTTON WEAVERS.

1556 **Cotton Weaver.** Learned fixing in England and has been 16 years in Canada, 8 years overseer of weaving, beaming and warping. Wants to work in the U. S. will accept $3.00. Age 33; married.

1573 **A1 Cotton Weaver** on drills, prints, sheetings and fine goods. Now employed but wants to change for larger room. Has had charge of medium size mill, and would take position as superintendent. First class in every respect, large experience, best of references.

1533 **Overseer Weaving or Superintendent.** American; age 38; married. Has had twelve years experience on all grades of white and colored fancy goods. Would like overseers' position in large weaving room, or on carding.

1572 **Overseer of Cotton Weaving,** now employed in first class mill as second-hand, but would like to have charge of a room at $3 a day. Experience covers sheetings, sateens, drills, flannels, denims and stripes of all kinds. Lowell and Whitin looms. American; age 32, married. Excellent references from present and past employers.

1563 **Overseer Cotton Weaver** who has long experience as fixer, second hand and overseer on all kinds of cotton and silk looms. Splendid references from past employers. At present employed. Age 40; married.

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1544 **Underwear Knitter.** 10 years' experience on ribbed underwear. Has run silk, worsted, lisle, cotton and mixed yarn. Best references from present employer, with whom has worked four years. Can leave at once.

1549 **Knitting Machine Fixer.** 17 years' experience on almost all kinds of machinery. Now employed; wants to change; would expect $2.25. Age 38; married.

1492 **Boss Knitter,** Spring needles. Now holding a position in N. w York. A No. 1 on fleeces, both single, double, and cut pressers. Understands running and setting in all gauges from 12 to 32. Working at present on 26 and 30. Understands all makes of latch needles for underwear.

1554 **Boss Knitter.** Underwear, Jersey ribbed, lisle, wool, plaited work, silk Can handle any latch machine. Good references. Age 26; married.

1435 **Boss Knitter.** Underwear, astrakhans, stockinet, rubber linings, etc. Efficient workman on circular spring needle machine. Age 36. Married.

1401 **Boss Knitter** at present employed but wants to change. Experience on plush, cotton, and wool. 10 years as second hand previous to present position as overseer. Age 30. Married.

1568 **Underwear Knitter.** A young man with thorough training, and 7 year's experience as second-hand in N. Y. mill, wants position as boss knitter. Ribbed, fleece lined, cotton and woolen underwear. Campbell & Clute, Tompkins & Circular Rib Machine. American. References, first-class.

DYERS.

1531 **Boss Dyer.** American; Age 32 unmarried. Has had a large experience on raw stocks, rags, worsteds, yarns, pieces, cassimeres, kerseys and dress goods. Not at present employed. Can take position immediately.

1505 **Boss Dyer** on all classes of wool, woolen and worsted yarns, cotton warps, indigo, etc. Desires to change to better himself.

1476 **Boss Dyer.** Experience on kerseys, broadcloths, dress goods, cassimeres and worsted piece dyes. Has been in good mills for 3, 5 and 7 years and gave satisfaction. Would start in New England or Central States for $3.00 a day.

180 **Woolen Dyer.** Age 42; married. Has had a large experience, and is a good practical man. Used to all classes of goods. Has worked largely on government orders. Good indigo dyer. Refers to former employers and others.

1355 **Wool and worsted Dyer,** a young man with 5 years' training by one the best dyers at one of the largest mills in N. E. Experience on worsted and woolen cheviots, clays, worsteds, suitings, cloakings, beavers, dress goods, carriage cloths, yarn, slubbing, wool. Now boss dyer. Good reasons for desiring a change.

1559 **Boss Dyer,** raw stock, cotton, woolen and worsted yarns and piece dyes. A Scotchman with very thorough training. 13 years in this country. Now employed but will change for good job paying over $3.00. Age 32.

1561 **Boss Dyer,** with long experience on all kinds of worsted, serges, cloakings, flannels, repellants, kerseys, also all wool, cotton and silk. Best of references. Age 35; married.

DESIGNERS.

1586 **A Young Designer** with training in a German Textile School and Norwegian Woolen Mills, has recently arrived in this country and would like to connect himself with the designing department of some first class mill. At present temporarily employed and can give American references. A bright, young Norwegian, who will doubtless develop into a first-class designer.

1577 **Assistant Supt. or Designer.** Has had experience as designer on beavers, kerseys, cassimeres, cheviots and wool, worsted and cotton novelty dress goods. A graduate of Philadelphia Textile school. Has had practical mill experience as loom fixer on Knowles & Crompton looms, dresser and beamer, also in office work, book-keeping, caiculations, etc. He is at present employed. Age 25, single

1474 **Designer of Woolens or Worsteds.** Has had textile school training, and about four years in good mills on novelty dress goods, cassimeres, blankets, coverts, etc. Very well recommended. Can accept position at once as designer or assistant superintendent.

1449 **Overseer of Weaving or Designer.** Age 38; married; American. Thoroughly capable. Has designed his own goods for eight years, and studied designing for two years. Left last position on account of sickness, and will take a small salary to start. Has worked on all classes of cottons, plain and fancy, and is acquainted with all makes of machinery. Refers to former employers and others.

1509 **Designer, or Boss Dresser,** or will take superintendency of small mill. Age 38; married. Has worked on dress goods, fancy worsteds, cloakings and piece dyes. At present employed as boss carder, but desires to better himself, if possible.

FINISHERS.

1526 **Foreman of Finishing Room,** Folding, Packing, etc. Age 45; married; English. Has worked on white and colored goods and prints. Is acquainted with every kind of machinery used in his business. Has worked 11 years in this country. Can give good references.

1534 **Overseer or Second-hand** Woolen Finishing. Age 26, unmarried. Has worked on fancy and piece dyes, broad-cloths, coverts, cassimeres, etc At present employed, but wishes to better himself. Good references.

1494 **Finisher on Felts,** or will take a position for the making of sizing. Age 26; single. His last position was engineer and in charge of sizing and finishing all classes of felts. Good references.

1499 **Overseer of Finishing.** Age 43; American. Has worked on flannels, cheviots, cassimeres, fine suitings, broadcloth, hair lines, etc ; from loom to case Was 14 years with his last firm to whom he refers.

1489 **Boss Finisher, Second-Hand** or Boss Shearer. Well experienced; excellent references. English; age 27; single.

1396 **Wool Finisher.** This man has had a very large experience among well-known mills and refers to past employers. Character and ability of the first order.

1351 **Woolen and Worsted Finisher** with 7 years' experience as overseer in R. I. and N. Y. mills, from which he has excellent references. At present second hand in one of the best worsted mills in N. E. Habits first-class; age 29, married

MISCELLANEOUS.

1571 **Woolen Salesman,** who has filled successfully all positions in woolen jobbing house, desires a position with manufacturer or dealer in textile goods. Fine business qualifications and A 1 references.

1566 **Overseer Cotton, Slashing,** Beaming, Warping and Dressing. Now employed as overseer in good mill, but would change for better job in a N. E. mill. First-class references. Married. Age 43. American.

1488 **Boss Carpenter or Master Mechanic.** Age 46; American. Is acquainted with all makes of cotton machinery, and is a good man on shafting. Wood work, etc. At present employed, but wishes to better himself.

1557 **Bleacher,** overseer or second hand. Well recommended, good training, reliable. Wants $2.50. Age 27; married.

1558 **Supt. of Bleaching,** dyeing and finishing, of all classes of cotton piece goods, plain and figured, desires a position. Has had over 20 years' experience in managing help, and has a thorough knowledge of the business in all its branches. Can furnish excellent references from present and past employers.

1555 **Silk Superintendent.** Experience in all departments of a large and successful mill; serges, sateens, linings. Young man but well qualified to take charge or to act as assistant superintendent. Knowledge of office work and prices as well as machinery.

1552 **Overseer Beaming & Slashing,** at present employed but would like to change for good boss job. First class experience and good references, age 32.

1560 **Overseer Twisting and Reeling** who has worked 20 years in the same mill, 10 years as overseer, has resigned on account of new supt. Refers to proprietors and former supt. Age 38, married. Experience on threads and twines.

1583 **Overseer of Cloth Room.** A young American, married, would like a position as office assistant, shipping clerk or in cloth room. Has had about six years' experience in Connecticut cotton mills. Will start at moderate wages if there is prospect of future advancement.

1520 **Overseer on Prints, Sheetings** and Shirtings. Age 32; married. Wishes to obtain a position in the New England States.

1579 **Supt. of Broad Silk Plant.** A man of executive abilities and with long and thorough experience in the designing and manufacture of all classes of silk goods. A1 references.

Experienced Finisher

Desires situation. Twenty years' experience in Scotland and England, and eight years in the United States. Thorough knowledge of all classes of men's wear and ladies' dress goods. Good manager of help.

Address K. H. Forrest,
604 Tremont St, Boston.

WANTED MILL ACCOUNT

of white and black lawns by commission man in touch with leading manufacturers east and west Address P, Dry Goods Economist, New York City.

Saving in Fuel.

MECHANICAL DRAFT.

The possibilities in the way of reduction of fuel cost in modern boiler practice by the introduction of mechanical draft, are well exemplified by the accompanying results obtained at the United States Cotton Co., Central Falls, R. I. This record covers a period of 52 weeks.

Number of hours run, 2998.
Average indicated horse-power, 1543.84

Coal.	Pounds Burned.	Cost.
Buckwheat . . .	6,074,400	$7,316.89
Anthracite . . .	1,173,826	800.34
Cumberland . .	565,906	836.60
Total . . .	7,814,132	$8,953.83

Cost per ton, $2.29
Cost per I. H. P. per year, 5.80

Composition of mixture.

Buckwheat, 78 per cent.
Anthracite dust, 15 per cent.
Cumberland, 7 per cent.

100 per cent.

The plant consists of three Babcock & Wilcox boilers of 335 rated horse-power each, a total of 1005 rated horse-power. The engine is a cross-compound Harris-Corliss, developing, as will be noted, an average of 1543.-84 indicated horse-power. The remarkably low fuel cost of $5.80 per I. H. P. per year in a plant without economizers, is primarily due to the employment of a low grade mixture costing only $2.29 per ton, the burning of which has been rendered possible by the introduction of mechanical draft. The draft of the chimney, which was previously employed, lacked the intensity necessary to the free combustion of this fuel, and as a consequence it had been necessary to use Cumberland and semi-bituminous coal.

The installation of the fan, costing less than $600, brought about an annual saving of no less than $6500 in the fuel bill. The fan, which was built by the B. F. Sturtevant Co. of Boston, is provided with a direct attached engine, the speed of which is regulated by a device of the chief engineer, Thos. J. Burke, whereby a scarcely perceptible change in the steam pressure immediately alters the speed of the fan, and consequently the intensity of the draft, and instantly brings the pressure back to normal. As a result, the steam pressure remains almost absolutely constant.

What Mill-Construction Is.

Mill-construction consists in so disposing the timber and plank in heavy solid masses as to expose the least number of corners or ignitable projections to fire, to the end also that when fire occurs it may be most readily reached by water from sprinklers or hose.

It consists in separating every floor from every other floor by incombustible stops,—by automatic hatchways, by encasing stairways either in brick or other incombustible partitions,—to the end that a fire shall be retarded in passing from floor to floor to the utmost that is consistent with the use of wood or any material in construction that is not absolutely fire-proof.

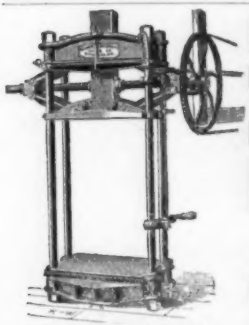
It consists in guarding the ceilings over all specially hazardous stock or processes with plastering laid on wire-lath, or upon dovetailed-lath, following the lines of the ceiling and of the timbers without any interspaces between the plastering and the wood; or else in protecting ceilings over hazardous places with salamander, asbestos air cell board or sheet metal.

It consists not only in so constructing the mill, workshop or warehouse that fire shall pass as slowly as possible from one part of the building to another, but also in providing all suitable safeguards against fire.

It consists in laying the top floor and an outer boarding of the roof over mortar, salamander or other heat retardent laid upon thick plank, where the maximum of safety is to be attained.

ATKINSON.

—Holy or sacred textiles, in one form or another, have in past ages been not uncommon.



KNUCKLE-JOINT.

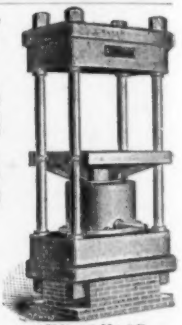
BOOMER & BOSCHERT

BALING PRESSES

ARE THE STANDARD.

Boomer & Boschert Press Co.

338 West Water St., SYRACUSE, N. Y.



HYDRAULIC.

EASTON AND BURNHAM MACHINE CO.,

Pawtucket, R.I.

ALL KINDS OF

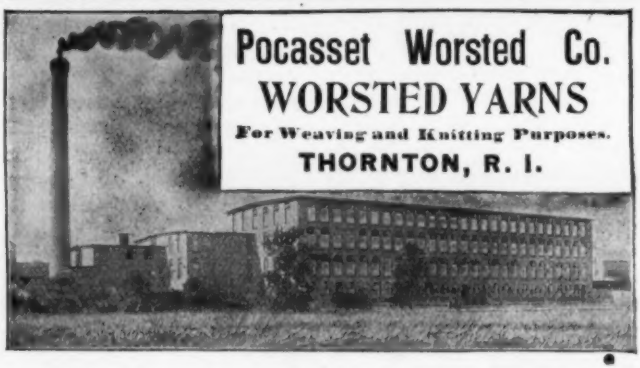
Spindles

USED IN THE MANUFACTURE OF

COTTON, WOOL & SILK

IMPROVED UPRIGHT SPOOLERS

TO SPOOL FROM COP, SKEIN, OR BOBBIN.



Pocasset Worsted Co.

WORSTED YARNS

For Weaving and Knitting Purposes.

THORNTON, R. I.

Knitting and Weaving Yarns

Cones, Cops, Warps, Skeins,
Single, Double, Three-ply, etc.
Peeler, Egyptian, Mixed Colors.
Large Assortment.

EDWARD S. HYDE, 223 and 225 Chestnut Street, Philadelphia, Pa.

YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn: The American Cotton Yarn Exchange reports that midsummer finds the cotton industry of New England in a very prosperous condition and mills employed to their fullest capacity. This is very remarkable for this time of the year. Buyers find it difficult to obtain cotton goods; stock of all kinds very low, and maufacturers are not making concessions to secure orders. Values are unusually firm and tendency upward. Buyers are now confronted with a decidedly new experience for them, and can no longer dictate terms to the sellers, as they have been doing for the past two or three years. There are mills, which we can name, that cannot take on any new business for several months to come. Certainly, present situation of cotton goods must be very gratifying to all interested.

Worsted Yarn: The weavers are all busy on heavy weight cloth with orders which will last until September or even into October. Mills, or many of them, are running nights to keep up with the demand, and orders are being refused because manufacturers cannot fill them. This is the situation so far as weavers of worsted cloth are concerned. Buyers realize they are left and the scramble has only begun. The great demand for cloth is that made from 3/8 to 1/2 blood yarn, which seems to be the popular grade. Prices have advanced on all these grades from 8 to 10 cents per pound, and spinners are not anxious to take contracts on that basis; even as now no one can tell where the price of the raw material will land them. Spinners will not accept orders except for immediate delivery, and as many of the weavers have purchased yarn to the limit of their capital, many will take chances on the market, and advance cloth to the consumer. Another factor of the buying is that weavers do not know just what yarn to purchase, and will not until the light weight samples are opened about August 15, when weavers must buy further and will pay what the spinners ask or go without. Buyers of cloth are trying to get sample ends from which to order light weights, but mills generally are forcing buyers to wait until the samples are regularly opened. As they have plenty of orders on heavy weights, the weavers are in no hurry. Fancy worsteds are most in demand and everyone is calling for fancy stripes. We hear of many, or some, sharp trades in connection with the weaver-spinner combination. A certain manufacturer of Rhode Island with 140 looms agreed to sell his plant on a basis of $1000 per loom. This proposition was accepted, and he immediately made an addition to his mill and put in an additional 60 looms, making thereby a neat little $60,000 additional on his deal. Spinning mills which have been contemplating selling out to the worsted yarn trust have few orders on hand and have been generally out of the market. Some have bought freely of wool or own wool at low prices and will make money by the advance in yarn, but many of these mills have neither orders or wool, as they ran stocks down as low as possible. In many instances tops are worth more than what yarn is sold for. Weavers have been left before on booms, and are working cautiously. Many on the last big advance bought heavily, and then found that they could have bought yarn for less money after carrying it for six months. At any rate they are working cautiously, paying the advance and trying in all ways to break the market. We were talking with a leading commission merchant not long since, who said, "We are not bothering ourselves about the worsted spinner-weaver trust. All our mills

Frank E. Patterson, Prest. Oscar W. Wood, Treas

GERMANTOWN SPINNING COMPANY INCORPORATED GERMANTOWN JAN. 9TH 1890

Germantown Spinning Co.

COTTON CARDED

HOSIERY YARNS

In numbers from 6s to 26s.

Germantown, Philadelphia.

W. Warren Thread Works,

SPOOL COTTON

on 100 to 12,000 yd. Spools or Tubes.

A Specialty of Thread for Manufacturers Use

on Spools, Tubes or Bobbins.

Also Seaming and Hosiery Yarns

on Cones, Tubes or Skein.

Our bleaching and dyeing facilities are new and unsurpassed for prompt and neat work. Correspondence solicited.

WESTFIELD, MASS.

The Best is the Cheapest.

It is BETTER and CHEAPER to wind yarn by the "Universal" system before shipment from the mill, thus insuring perfect delivery to knitting machines without rewinding.

UNIVERSAL WINDING CO.,

F. H. BISHOP, Manager.

226 Devonshire St., - Boston, Mass.

(Continued from page 149.)

are small ones, which we are running in some instances day and night, and with up-to-date machinery the cumbersome mills of the trust cannot touch us." The commission house which has always conducted business honorably and on the square need not fear trusts, because plenty of new manufacturing enterprises are seeking concerns of this kind. Of course skin commission houses must go and it is a good thing for the trade that they are out of it. It is noted throughout the trade that manufacturers out of the trust are adding new looms and the best commission houses are holding on to trade. Combers of tops are busy, with prices well maintained. We note that the new silk and wool top is giving good satisfaction. This top is well liked because it reduces the cost of the wool top, and at the same time gives the fine feel of Australian wool at a low cost. The United States Worsted Co., so called, is trying to get itself into line, and the promoter states that they have already spent $15,000 for a charter and other expenses. For all this, as yet the whole scheme is in the air, with the chance of an upward movement. The worsted trade generally is in a prosperous condition, and the independent mills are having the best end of the business. It is asserted that there will be a greater demand for yarn than the supply can take care of. The spinners of French spun yarn are holding out for higher prices, with the only drawback that the knitters are not nearly as prosperous as the weavers.

Woolen Yarn: Spinners are fairly busy on orders placed earlier in the season. The business is in spots, some spinners being very busy, others not nearly so well employed. Some have orders that will last until the end of the heavy weight season, while some have very few orders. Weavers have been ordering much yarn out of their regular supply. The heavy weight season will be over in September, and

(Continued on page 153.)

CATLIN & CO.,
YARNS.
67 Chauncy St., Boston
216 Church St., New York.
206 Chestnut St., Philadelphia.

Walcott & Campbell Spinning Co,
IROQUOIS MILLS.
FANCY HOSIERY YARNS
IN ALL COLORS.
New York Mills, Oneida Co., N. Y.

JAMES E. MITCHELL & CO.,
Commission Merchants.
122 & 124 Chestnut St., Philadelpia, Pa.
74-78 Summer St., Boston.
Cotton, Woolen & Worsted Yarns.
All numbers on Hand and Made to Order.

COTTON WARPS
White or Colored.
Toweling and Grain Bags.
Dana Warp Mill,
WESTBROOK, MAINE.

TUCKER & COOK MFG. CO
MANUFACTURERS OF
WHITE AND COLORED COTTON **WARPS**
Nos. 6s to 30s,
On Beams, Jack Spools or in Chain
CONWAY, MASS.

GRANT YARN CO.,
COMBED AND CARDED COTTON
YARNS 40s and above. AND
FITCHBURG, MASS. **WARPS**

E. JENCKES MFG. CO.
Colored Cotton, Hosiery, Woolen and Merino **YARNS**
PAWTUCKET, R. I.

LINEN YARN IMPORTER.
Hughes Fawcett, 115 Franklin St., New York,
Flax, Hemp & Jute Line and Tow Yarns,
FOR WEAVING PURPOSES
Linen Jacquard Harness Twines.
Fine Cotton Harness and Heddle Twines.
For Cotton, Silk, Woolen and Carpet manufacturers. Correspondence solicited. Samples promptly furnished.

CAPACITY, 50,000 Spindles.

ORSWELL MILLS

FITCHBURG MASS.

COMBED OR CARDED

COTTON YARNS

In Chains and Skeins, on Balls, Beams, Spools—single or twisted.

...CORRESPOND WITH THE...

American Moistening Company, Boston, Mass.,

And learn what their system of air moistening has accomplished. The

"DROSOPHORE" AND "VORTEX" HUMIDIFIERS

Have been most advantageously adopted by the representative mills of this country. Our system will increase your production and overcome troublesome electricity, making your carding run much better. It will reduce your waste account, and generally prove a profitable investment. With our system a perfect **Spinning** or **Weaving** atmosphere in any climate or weather is assured, and any degree of humidity is obtainable. Will cool the air in warm weather, and warm it in cold weather. **Purifies the air and makes it healthier for the work people.** Write for Booklet on Humidification.

AMERICAN MOISTENING COMPANY, 150 Devonshire Street, Boston, Mass.

Cotton Warps.

WHITTIER COTTON MILLS,
LOWELL, MASS.

YARNS

SOLIS : : BOSTON.

179 Devonshire Street.

ANDREW J. SOLIS, Jr. & CO.

INDIAN ORCHARD COMPANY,

Indian Orchard, Mass.

Manufacturers of - - - -

COTTON WARPS AND YARNS

In gray and all colors, single or in any twist.

COLORED COTTON

Machined, Carded or in Roving.

NOVELTY YARNS

In Cotton, Mercerized Cotton, Silk and Worsted, in various Patterns, Colors and Twists.
We are always pleased to assist our patrons of the Woolen Goods manufacture in special pattern warps for samples.
We use a uniform grade of long stapled cotton in all our manufacture.

(Continued from page 151)

then the spinners will not be so busy. It is a fact that while weavers of worsted cloth are very busy, the cassimere mills and the knitters have called for very little wool or yarn. Many weaving mills on this cloth are idle, while the knitters, instead of using wool, are running cotton. There is, however, a good demand for 2-ply yarns. Wool continues to advance, notwithstanding the condition of the trade using clothing wool; and the prevailing opinion is that territory wool will reach 60 cents per pound. Whether this will be so on short staple wool no one can predict, but on long wools it may be entirely a fact. Manufacturers realize that Australian wools are beyond their reach, and are today buying California and Oregon wool for combing, a thing that has never before happened in the trade. One of the leading London wool merchants, under date of July 8th, writes: "The attendance at the last sale continued large, and the main support came from the English trade, which operated with freedom, whilst German, and especially French, buyers showed great reserve." Twenty-six cents per pound will buy such stock, of 48 per cent. shrinkage. For the next series the fresh arrivals to date are 136,000 bales. Regarding our present market many dealers bought on speculation, and will unload just as soon as the light weight season opens. This advance had to come, when one considers that fine and fine medium wools were on a parity with 1/4 and 3/8 blood wools. Some of the larger manufacturers have not purchased large supplies, and if a good light weight season results, these mills will be large purchasers of wool. These mills did not expect the great advance to come until they had started to purchase, hence their present position. The knitters, in general, manufacturing wool underwear, are having a poor business as most of the trade is for cheap cotton fleece lined goods, and they do not see why there should be

(Continued on page 155.)

WOOLEN AND MERINO
YARNS. Special line for Bicycle and Golf Goods in all shades. For Hosiery, Gloves, Underwear, and all kinds Knit Goods. Cop, Cone and Skeins.
The J. & H. Clasgens Co.
New Richmond, O.

WE BUY FOR CASH!
ODD LOTS OF
YARNS AND WARPS
ENOS CROSLAND'S SONS,
Haverford Ave. and 69th St., PHILA., PA.

A. HERBST. J. W. JONES.
HERBST & JONES,
KENNEBEC WORSTED MILLS.
Successors to Kershaw Worsted Co.
WORSTED YARN SPINNERS,
21st & Naudain Streets,
PHILADELPHIA.

ALBERT R. ELSASSER,
Clifton Worsted Mills.
WORSTED YARNS.
Lustre Worsted a Specialty.
Mills: Addingham, Del. Co., Pa.

C. MOORE & CO.,
MANUFACTURERS OF
TWINES, THREADS AND YARNS.
Jacquard Harness Twines of all kinds on hand and made to order.
S.W. COR. FIFTH & MARKET STS.,
Philadelphia.

EICHMANN & STERNBERG
530 Broadway cor. Spring St., NEW YORK.
Plain and Gassed Cotton Yarns,
HOSIERY COTTON YARNS,
Mercerized Cotton Yarns. Harness Twines.

Cohannet Mills,
TAUNTON, MASS.
Spinners of High Grade
HOSIERY YARNS OF EVERY DESCRIPTION.
Selling Agents JAMES E. MITCHELL & Co., Philadelphia and Boston.

RICHARD CAMPION,
Selling Agent for—
Bristol Worsted Mills,
Highland Worsted Mills.
17 Bank Street, Philadelphia, Pa.

HADLEY
SPOOL COTTON AND FINE YARNS
COMPANY
COTTON SPINNERS.
MILLS AT HOLYOKE, MASS.

SPINNERS OF
FINE COTTON YARNS
30s TO 100s.
Gray, Bleached, or Colored. On cop, in skein on spools, cones or tubes.
Fine Cotton Warps, single and two-ply, in chain, etc.
Spool Cotton and Seaming Thread.
95 Milk St., BOSTON.

THE WILLIAM CLARK COMPANY,
WESTERLY, R. I.
Mills equipped with the latest and most improved machinery.
Combed Egyptian from No. 20s to 100s. Combed Sea Island from No. 40s to 200s.
Also 2, 3, 4, 5 ply and 6, 9 and 12 ply cable laid.
Hosiery Yarns on Cops Tubes or in Skeins, Grey, Bleached or Dyed. (Fast Colors.

MONUMENT MILLS,
Manufacturers of
White, Colored, Fancy and Double and Twist,
COTTON WARPS
HOUSATONIC, MASS.
4s to 60s.

GREENE & DANIELS MFG. CO.,
COMBED, CARDED AND GASSED
Yarns, Threads, Twines and Chain Warps,
Colored and Bleached Yarns Furnished in any manner desired by the trade.
PAWTUCKET, R.I.

Established 1849.
CARRIAGE CLOTHS.
LIVERY CLOTHS.
ACCOUNTS SOLICITED.
Broad Cloths, Sackings,
Cotton Warps, Whip Cords.
C. Coles Dusenbury & Son,
396 & 398 Broadway, N. Y. City.

HAYES, O. H. & CO.
Representative Lines of Woolens
O. H. HAYES & CO.
Liberal arrangements made with manufacturers or men controlling mills' productions.

(Continued from page 153.)

this great advance in wool. The knitters of wool underwear who are busy are running on stock purchased at low prices, and have enough stock in some instances to last until the end of the heavy weight season. They all talk the same old story, that buyers want goods at last year's prices. They seem to realize that they cannot longer buy and use Australian wool, and do not know what they are to do when their stocks run out. Much silk is being substituted for wool, and Australian thread waste is taking the place of lamb's wool.

Philadelphia Yarn Market.

We report trade active the past month. Prices are generally firm, but very little advance. This position seems unlikely to last from the fact that cotton costs spinners in the South, today, from 1 cent to 1½ cents, and in some instances more, than last fall. Prices are generally as low, and in many instances lower. With continued good business, there certainly ought to be a sharp advance. Many spinners are starting up their looms and using their product, instead of marketing their yarn. It will certainly curtail the output.

Worsted spinners are busy.

Woolen spinners are in somewhat better position. With increased business, weavers and spinners are scarce in Philadelphia.

FRENCH AND BRADFORD SYSTEMS

B. F. BOYER & CO.,

WORSTED YARNS

IN WHITE AND MIXES.

Woolen and Merino Yarns

OFFICE AND MILL
Delaware and Cooper Sts.
Camden. N. J.

Eddy & Street,

COTTON, **YARNS** WORSTED,
WOOLEN, AND SPUN SILK.
BRAIDS

PROVIDENCE, R. I.

WAVERLY WORSTED CO.

SPINNERS OF

WORSTED YARNS

FOR WEAVING AND KNITTING.

Main St. & Green Lane, Manayunk, Philadelphia.

We quote as follows:—

Warps:—

20/1	12
22/1	12¼ to 12½
26/1	12¾ to 13
12/2	12
14/2	12 to 12¼
16/2	12½ to 13
20/2	13
30/2	15 to 15½
40/2	21 to 22
24/2	14
26/2	14 to 14½

(Continued on page 157.)

The J. R. MONTGOMERY CO.,

WINDSOR LOCKS, CONN.

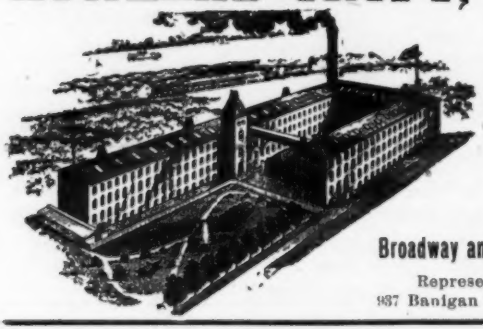
Manufacturers of

Mercerized Cotton Yarns. GIVES THE HIGH SILK-LIKE LUSTRE IN KNIT GOODS AND WOVEN FABRICS

Novelty Yarns. BOUCLE, BOURETTE AND SPIRALS, IN COTTON, WOOL, WORSTED, MOHAIR AND SILK.

Cotton Warps. ON BEAMS, JACK SPOOLS AND TUBES. IN FANCY TWIST COLORS AND PRINTED.

HOWLAND CROFT, SONS & CO.



LINDEN WORSTED MILLS.

Fine Worsted Yarns

OFFICE AND MILLS:

Broadway and Jefferson Ave., Camden, N. J.

Represented by FIRTH BROADHEAD,
937 Banigan Building, Providence, R. I.

ALLEGHENY WORSTED MILLS,

Thomas Wolstenholme, Sons & Co., MANFRS. OF

ALL NUMBERS SINGLE AND TWO-PLY,

Worsted YARNS,

Sell Direct,

on Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural & Fancy Mixes.

Office and Mills: Frankford Ave. and Westmoreland St., Phila., Pa.

CRANSTON WORSTED MILLS.

Worsted and Mohair Yarns—white or colors, in skeins, on spools, cones, or shuttle bobbins.

NOVELTY YARNS—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making Yarns **only.**

CENAPPED YARNS of all kinds. Doup Yarns. Harness Yarns. For Braids, etc.

BRISTOL, R. I.

George Campbell & Co.

Worsted Spinners.

Yarns, both French System and Bradford.

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(Continued from page 155.)

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19s "	12 to 12½
26s	12½
4s to 10s soft	10½ to 11
14s soft	11½
16s	11½ to 12
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30/2	14½ to 15
40/2	20 to 22
8/3 hard	10½ to 10½
16/3 slack	11⅞ to 12
16/4 slack	11¾ to 12
12/3 slack	11½
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6s to 8s	10¾ to 11½
10s	11½ to 12½
12s	12 to 13
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16s	13 to 13½
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6s to 8s	11½
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12s	12
16s	12 to 12½
26s	13
40s	16½ to 17

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12s	14
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10s hosiery	12½
14s	13½
16s	14
20s	15
10s shuttle	12½
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Eastern skein ½c. above cops.

Eastern cones ½ to 1½c. above cops.

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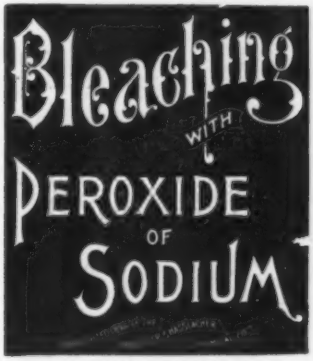

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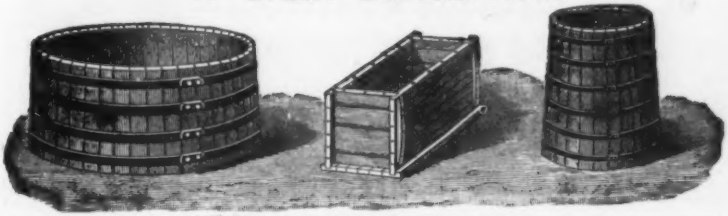

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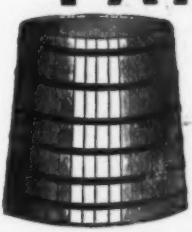

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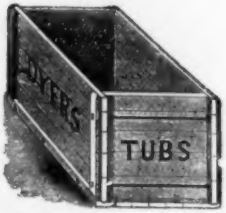

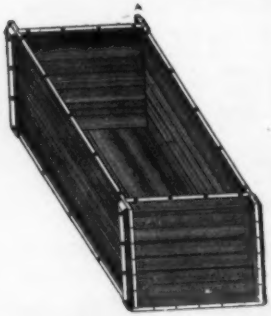

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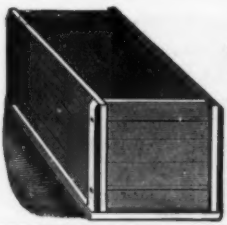

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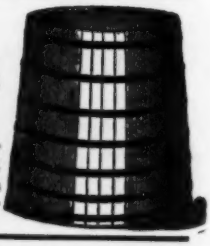

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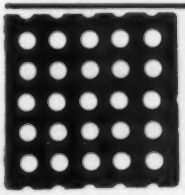

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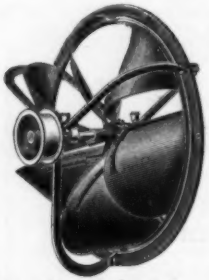

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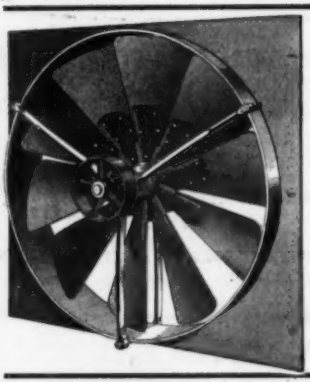

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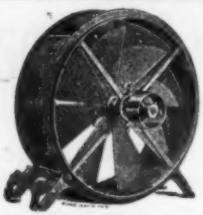

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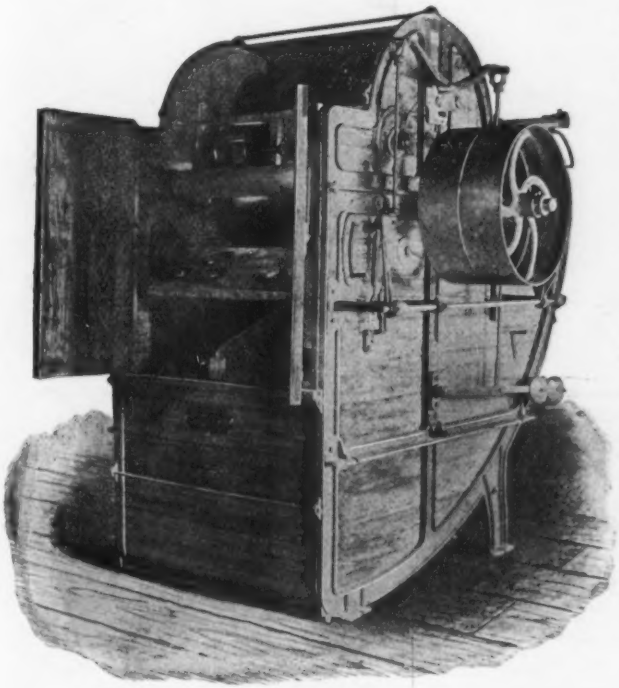

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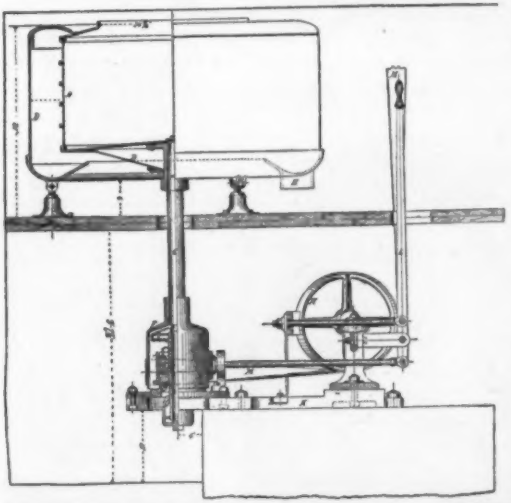

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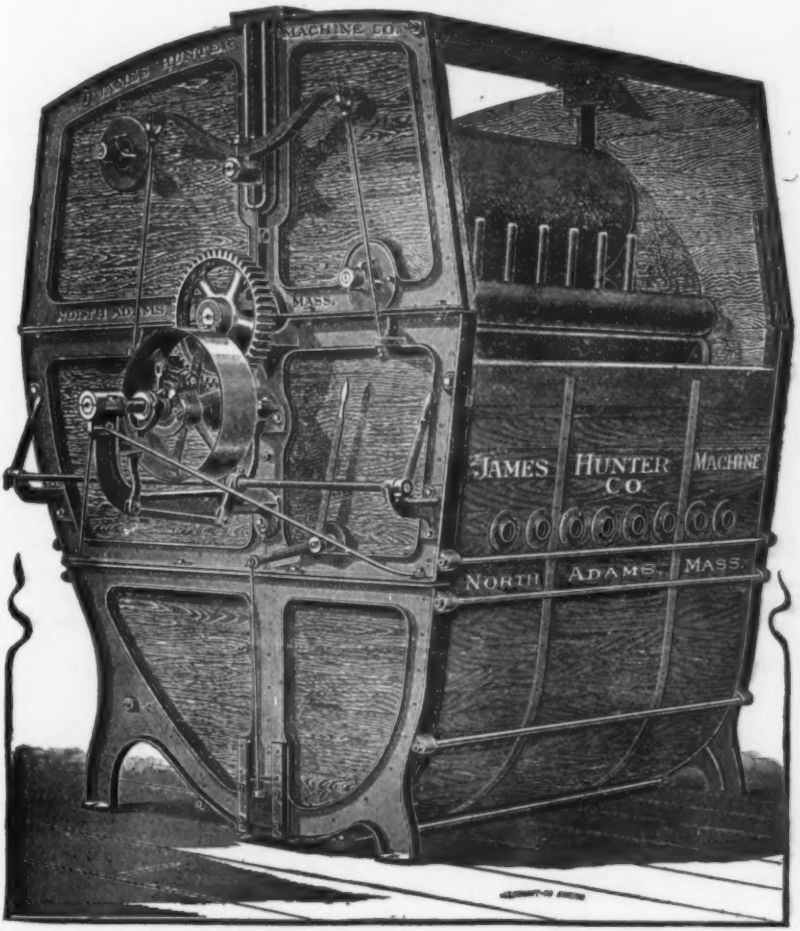

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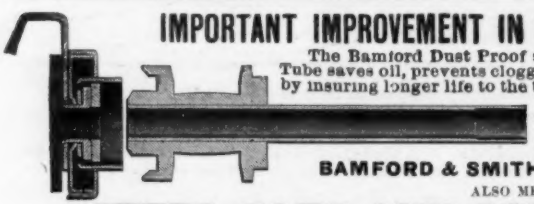

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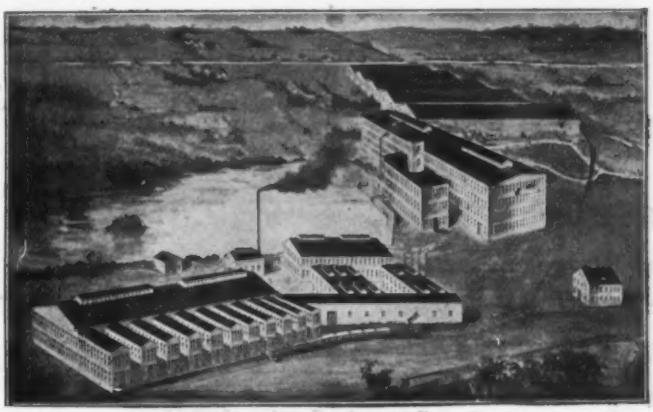

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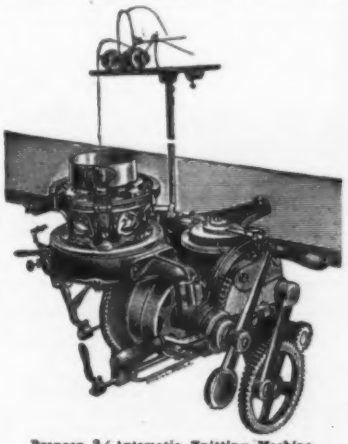

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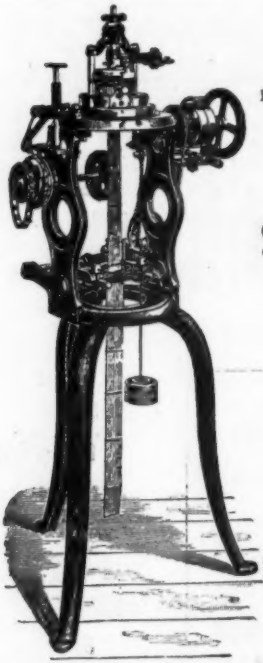

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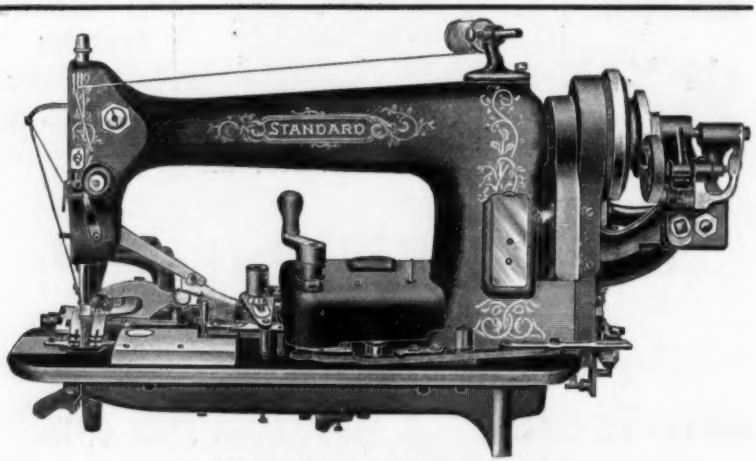

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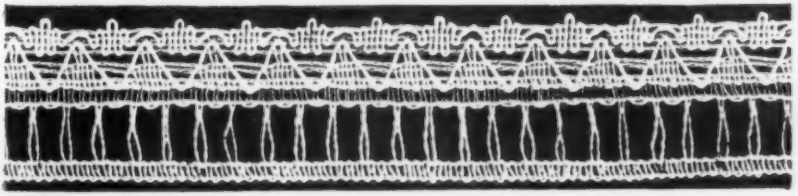

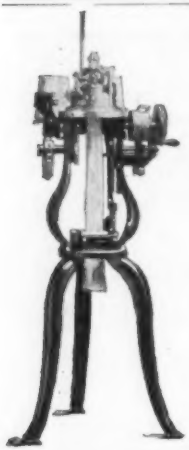

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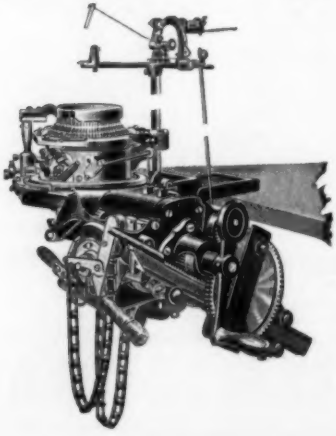

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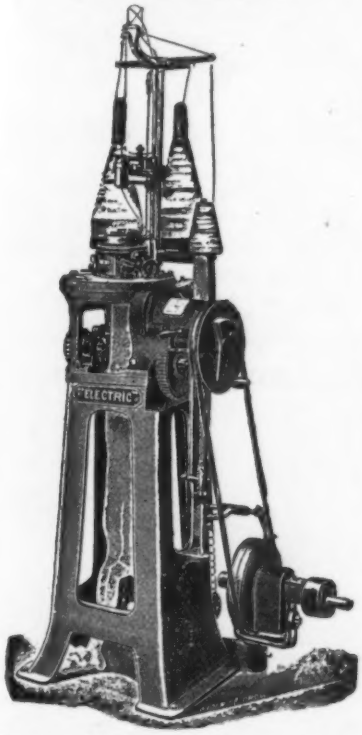

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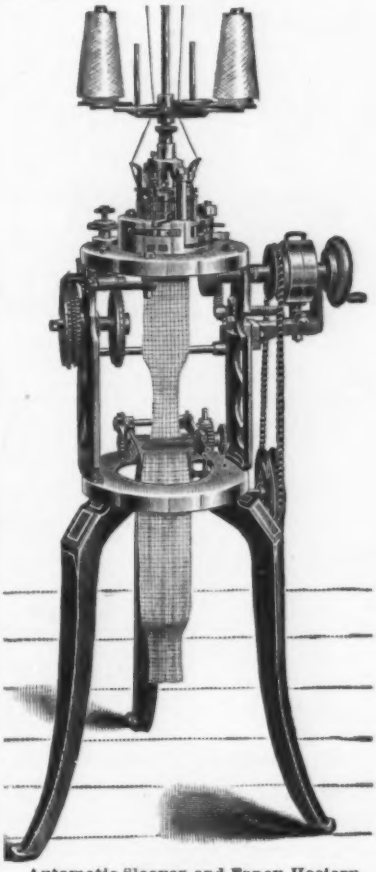

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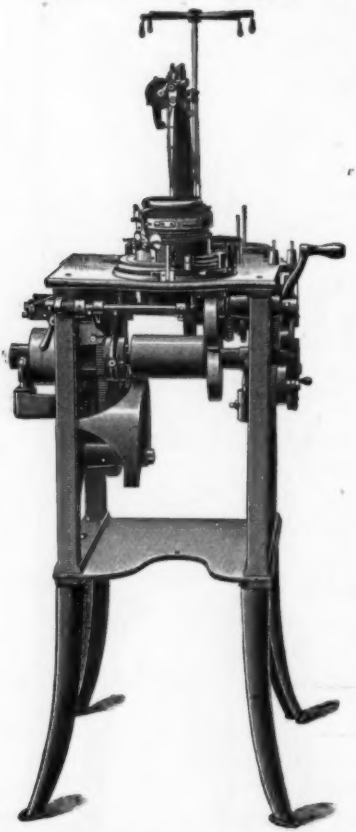

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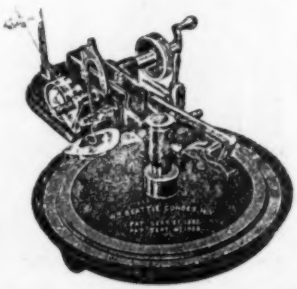

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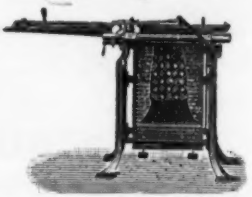

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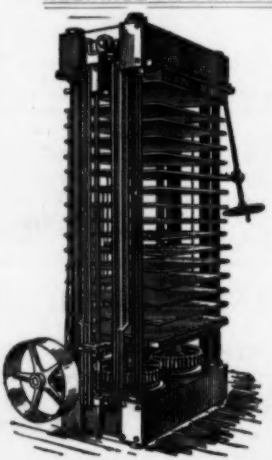

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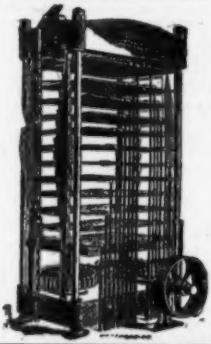

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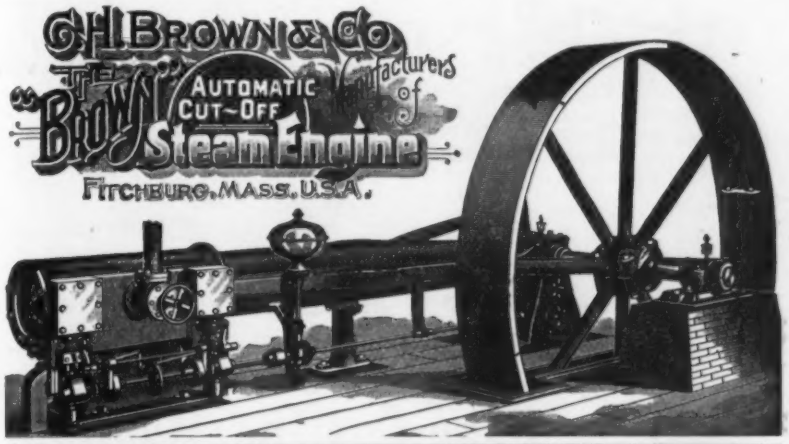

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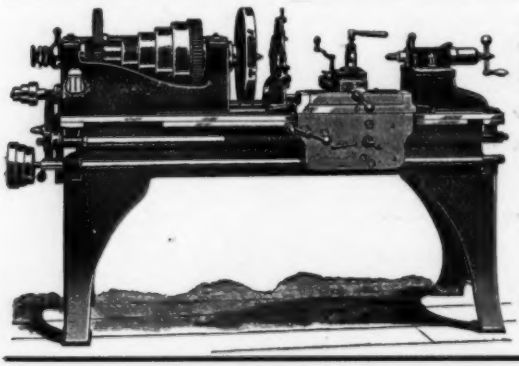

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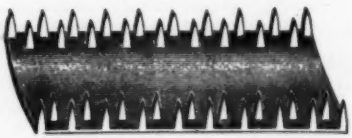

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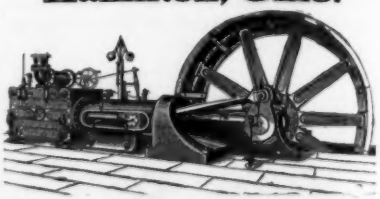

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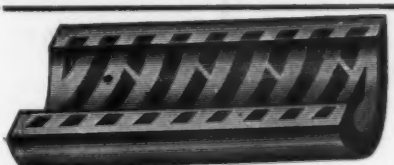

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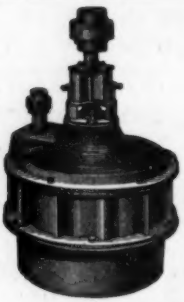

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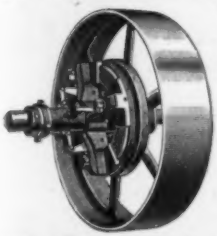

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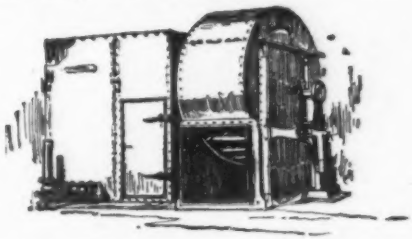

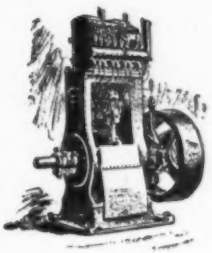

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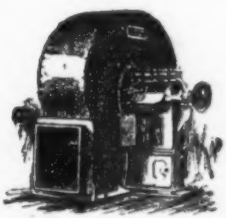

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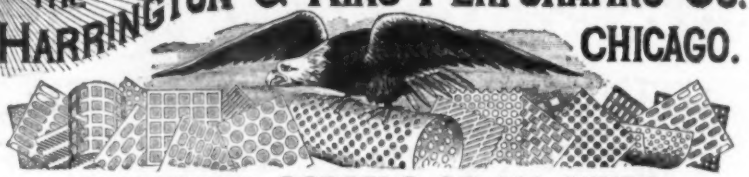

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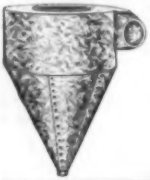

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